



Addiction Technology Transfer Center Network  
Funded by Substance Abuse and Mental Health Services Administration

# **Recovery/Remission from Substance Use Disorders**

## **An Analysis of Reported Outcomes in 415 Scientific Reports, 1868-2011**

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Intellectual disAbility Services**

**Great Lakes Addiction Technology Transfer Center**

**Recovery/Remission from Substance Use Disorders:  
An Analysis of Reported Outcomes in 415 Scientific Reports, 1868-2011**

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# **Recovery/Remission from Substance Use Disorders: An Analysis of Reported Outcomes in 415 Scientific Reports, 1868-2011**

William L. White, MA

## **Executive Summary**

The emergence of recovery as an organizing paradigm for addiction treatment and the larger arena of behavioral health care underscores the need to measure both early recovery initiation and stabilization and the prevalence of long-term recovery maintenance. Such measurement is critical in evaluating addiction treatment as a system of care and monitoring broader dimensions of community health.

Efforts to measure recovery are challenged by the lack of professional and cultural consensus on the definition and measurement of key constructs (recovery, remission, abstinence, and subclinical/asymptomatic/controlled/moderate use) and by conflicting rates of recovery—rates reported across clinically and culturally diverse populations in studies marked by widely varying methodologies, follow-up periods, and follow-up rates. Of particular import is the wide divergence between portrayals of the natural course of alcohol and other drug (AOD) problems in community populations and portrayals of such problems in clinical populations following specialized addiction treatment. These divergent portrayals constitute the ultimate “apples and oranges” of the AOD problems arena.

The question of recovery stability and prevalence is more than an academic one. The constant media onslaught of celebrities heading back to “rehab” after their latest falls from grace has produced a public unsure of exactly what “recovery” means and whether it is really attainable for all, or for only a few “morally enlightened” exceptions to the rule. The failure of a celebrity to achieve stable recovery garners great cultural attention, while the masses of those in long-term recovery pass invisibly through our culture each day. Recovery surrounds us in our neighborhoods, our businesses, our schools, and our houses of worship, but we do not see it. We see instead the highly visible fruits of the problem. The pessimism flowing from such selective attention feeds misunderstanding and fuels stigma and its far-reaching consequences.

This paper reviews 415 scientific studies of recovery outcomes (79 community studies, 276 adult clinical studies, and 60 adolescent clinical studies) conducted with clinically and culturally diverse populations in multiple countries over the past century. This review provides preliminary answers to five of the most important questions about recovery from alcohol and other drug problems.

*1. How many persons are in recovery from substance use disorders in the United States?*

This question was answered by extrapolating national estimates from the major governmental surveys of the course of alcohol and other drug use and related problems (including the Epidemiologic Catchment Area Study; the National Comorbidity Survey and its replication, the National Health Interview; the National Longitudinal Alcohol Epidemiologic Survey; and the National Epidemiologic Survey on Alcohol and Related Conditions) and from a 2010 recovery survey conducted by the Public Health Management Corporation in Philadelphia, PA and six surrounding counties. Based on this analysis, the percentage of adults in the general population OF the United States in remission from substance use disorders ranges from 5.3% to 15.3%. These rates produce a conservative estimate of the number of adults in remission from significant alcohol or drug problems in the United States at more than 25 million people, with a potential range of 25 to 40 million (not including those in remission from nicotine dependence alone).

*2. What percentage of those who develop AOD problems eventually achieve remission/recovery?*

Of adults surveyed in the general population who once met lifetime criteria for substance use disorders, an average of 49.9% (53.9% in studies conducted since 2000) no longer meet those criteria. In community studies reporting both remission rates and abstinence rates for substance use disorders, an average of 43.5% of people who have ever had these disorders achieved remission, but only 17.9% did so through a strategy of complete abstinence. One footnote to this high prevalence of non-abstinent remissions in community populations: Alcohol and other drug problems in the community, even problems that meet diagnostic criteria for substance use disorders, are generally less severe, less complex, and less prolonged than those problems found among people entering addiction treatment in the United States.

*3. What is the rate of remission/recovery for persons whose problems are severe enough to warrant professional treatment?*

In an analysis of 276 addiction treatment follow-up studies of adult clinical samples, the average remission/recovery rate across all studies was 47.6% (50.3% in studies published since 2000). Within studies with sample sizes of 300 or more and studies with follow-up periods of five or more years—two factors used as proxy for greater methodological sophistication—average remission/recovery rates were 46.4% and 46.3%, respectively. In the 50 adult clinical studies reporting both remission and abstinence rates, the average remission rate was 52.1%, and the average abstinence rate was 30.3%. Based on available information, this 21.8% difference appears to reflect the proportion of persons in post-treatment follow-up studies who are using alcohol and/or other drugs asymptotically or are experiencing only subclinical problems (problems not severe enough to meet diagnostic criteria for substance use disorders).

*4. Does the rate of remission/recovery for adolescents following specialized addiction treatment differ from that of adults who have completed such specialized treatment?*

Yes. This analysis compares 276 adult addiction treatment outcome studies conducted between 1868 and 2011 with 60 adolescent addiction treatment outcome studies conducted between 1979 and 2011. The average recovery/remission rate following specialty treatment reported in the adolescent studies was 42% (an average of 35% for studies conducted since 2000), compared to an average recovery/remission rate of 47.6% reported in the adult studies (50.3% average for studies conducted since 2000). Interpretation of this finding should be tempered by the greater number of adult studies, the larger sample sizes, and the much longer follow-up periods in the adult studies. While the high percentage of adolescents who report some AOD use in the months following treatment is discouraging, studies of the longer trajectories of AOD use confirm post-treatment increases in abstinence, reductions in use, and gains in global health among treated adolescents. There is cause for optimism regarding adolescents' long-term prospects for recovery from substance use disorders.

*5. How can local communities establish baseline remission/recovery prevalence data?*

To evaluate community-wide strategies by tracking changes in recovery prevalence over time, local communities can integrate recovery prevalence questions into regular community health surveys. A model for potential replication is the integration of recovery prevalence questions into the bi-annual community health survey conducted in the city of Philadelphia and surrounding counties by the Philadelphia Department of Behavioral Health and Intellectual disAbility Services and the Public Health Management Corporation. Such baseline data are being used there and could be used in other communities to guide recovery-focused systems-transformation efforts and to evaluate planned interventions in particular geographical areas (e.g., evaluating service needs by zip codes/planning areas and matching treatment/recovery support resources to those areas where levels of problem severity are highest and levels of recovery capital are lowest).

## **CONCLUSIONS AND RECOMMENDATIONS**

**Instability within the Course of AOD Problems and Their Resolution:** Point-in-time or short-term studies of AOD problems can mask the complex course of these problems by conveying prognoses that are overly optimistic (assumption that short periods of abstinence or remission are naturally sustainable) or overly pessimistic (assumption that persons resuming AOD use following intervention will all revert to symptomatic use and further escalation of problem severity). Periods of abstinence as long as 3 months are prevailing features of addiction careers and should not be interpreted as sustainable recovery or as evidence that professional help or peer support is not indicated. Successful recovery initiation is distinguishable from a respite within a prolonged addiction career only within a longer time perspective. Both addiction and recovery are best viewed as fluid rather than fixed states, but buried within this fluidity is a natural momentum toward remission and recovery. Even the most

chronic, intractable patterns of addiction contain opportunities for full recovery, and buried within even the most seemingly solid recoveries lie vulnerabilities for reactivation of addiction. This fluidity underscores the need for sustained and assertive recovery management.

Windows of Opportunity for Early Re-intervention: Of those who resume AOD use following treatment, most do so in the first days and weeks. This finding underscores the need for and value of assertive approaches to post-treatment monitoring, support, and early re-intervention for both adults and adolescents.

Role of Community In Recovery: The effects of brief professional interventions on long-term recovery outcomes are more ephemeral than enduring family and social support within one's natural environment. Recovery prevalence is influenced by personal and family factors and by broader historical, cultural, political, and economic influences on the resources available to those who have developed severe AOD problems. Recovery prevalence is shaped as much by community recovery capital as by personal recovery capital.

Solution Perspective versus Problem Perspective: Scientific studies of the long-term resolution of alcohol and other drug problems have constituted an afterthought in the alcohol/drug problems research arena. Substantial benefits might accrue from studies of the prevalence, pathways, stages, and styles of long-term recovery, but not until recently have these been the subject of focused attention. Much of the data available about recovery in this analysis have been extracted from the study of other issues, e.g., studies of the duration of treatment effects, relapse rates, or mortality rates. It is time for focused attention on the lived solutions to AOD problems at personal, family, organizational, community, and cultural levels.

Definition and Measurement: Challenges in defining and measuring recovery from significant alcohol and other drug problems can be overcome to generate national, regional, state, and local recovery prevalence data for purposes of planning, resource allocation, and program- and system-wide performance evaluation. The establishment of such a recovery-focused database should be a high priority at national, state, and local levels.

Recovery Mobilization: There is a significant population of individuals and families in recovery from alcohol and other drug problems in the United States who could be mobilized more widely to support prevention and early intervention programs, serve as volunteers in addiction treatment and recovery support programs, and provide leadership of AOD-related policy advocacy initiatives. Those who were once part of the problem constitute underutilized resources in the search for fresh solutions to America's alcohol and other drug problems.

Recovery Momentum: Studies of clinical populations suffering from severe, prolonged addictions—and the selective media coverage of these populations—create a pessimistic portrayal of the prospects for long-term recovery. According to the data reviewed in this paper, “insanity,” prolonged institutionalization, and death are not the normative outcomes of AOD problems. Recovery is not an aberration achieved by a small and morally enlightened minority of addicted people. If there is a natural developmental momentum within the course of AOD problems, it is toward remission and recovery. The central problem is not the difficulty of making recovery possible—that potential clearly exists. It is instead the long duration of time between problem onset and successful recovery stabilization—and the significant harm to individuals, families, and communities in the interim.



**Key Questions and Challenges:** Recovery from a substance use disorder is more the norm than an anomaly. Given what we know about recovery prevalence and the natural momentum toward recovery, the central research, clinical, and policy questions are:

6. What characteristics of the adolescent, family, treatment milieu, and community environment promote or inhibit the achievement of long-term recovery?
7. What strategies can be used to enhance the resolution of less severe AOD problems (via the elevation of community recovery capital) without the need for professional interventions?
8. How can addiction careers be prevented, quickly aborted, or shortened, and recovery careers extended, to reduce addiction's toll on the individual, family, workplace, community, and society?
9. What professional and peer support interventions can successfully elevate recovery outcomes for those with the greatest problem severity/complexity/chronicity and the least recovery capital?
10. How can recovering people and their families be mobilized to break intergenerational cycles of AOD problem transmission and to serve as a healing force within their local communities and the country as a whole?

These questions lie at the center of the movement to shift addiction treatment from a model of acute biopsychosocial stabilization to a model of sustained recovery management for individuals, families, and communities.

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**William L. White**

We are interested in the maintenance of the behavior, not merely its attainment.

—William Hunt and Wayne General, 1971

## **INTRODUCTION**

During the past decade, the concept of recovery and its related incarnations (e.g., recovery management, recovery-oriented systems of care) have emerged as a new organizing paradigm for addiction treatment<sup>1</sup> and the larger behavioral healthcare arena.<sup>2</sup> While recent progress has brought us closer to a definition of recovery,<sup>3</sup> a quantitative picture of recovery prevalence and recovery rates remains an enigma at professional and public levels. Elaborate data-collection systems have been established to measure the incidence and prevalence of

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<sup>1</sup> White, W. (2005). Recovery: Its history and renaissance as an organizing construct. *Alcoholism Treatment Quarterly*, 23(1), 3-15. White, W. (2007). Addiction recovery: Its definition and conceptual boundaries. *Journal of Substance Abuse Treatment*, 33, 229-241.

<sup>2</sup> Anthony, W. A. (2000). A recovery-oriented service system: Setting some system level standards. *Psychiatric Rehabilitation Journal*, 24(2), 159-168. Davidson, L., & White, W. (2007). The concept of recovery as an organizing principle for integrating mental health and addiction services. *Journal of Behavioral Health Services and Research*, 34(2), 109-120. Gagne, C. A., White, W., & Anthony, W. A. (2007). Recovery: A common vision for the fields of mental health and addictions. *Psychiatric Rehabilitation Journal*, 32(10), 32-37. Ralph, R., & Corrigan, P. (Eds.) (2004). *Recovery and mental illness: Consumer visions and research paradigms*. Washington DC: American Psychological Association.

<sup>3</sup> The Betty Ford Institute Consensus Panel (2007). What is recovery? A working definition from the Betty Ford Institute. *Journal of Substance Abuse Treatment*, 33, 221-228. Laudet, A. B. (2007). What does recovery mean to you? Lessons from the recovery experience for research and practice. *Journal of Substance Abuse Treatment*, 33, 221-228. McLellan, A. T. (2010). What is recovery? Revisiting the Betty Ford Institute Consensus Panel definition. *Journal of Substance Abuse Treatment*, 38, 200-201. SAMHSA (2009). Working definition of recovery. Excerpt from *National Summit on Recovery Conference Report, 2005*. Rockville, MD: Center for Substance Abuse Treatment. United Kingdom Drug Policy Commission. (2008). *A consensus definition of recovery*. Retrieved June 24, 2010 from "<http://www.ukdpc.org.uk/resources/A%20Vision%20of%20Recovery.pdf>" <http://www.ukdpc.org.uk/resources/A%20Vision%20of%20Recovery.pdf>. White, W. (2007). Addiction recovery: Its definition and conceptual boundaries. *Journal of Substance Abuse Treatment*, 33, 229-241.

alcohol- and other drug-related (AOD) problems, but there are few methodologically sophisticated counterparts that regularly report changes in the prevalence of recovery from substance use disorders (SUDs) in the United States.

This paper reviews 415 published community and clinical studies in an attempt to answer five questions:

1. How many persons are in recovery from SUDs in the United States?
2. What percentage of people who develop AOD problems eventually achieve recovery?
3. What is the rate of recovery for persons whose problems are severe enough to warrant professional treatment?
4. Does the rate of recovery for adolescents following specialized addiction treatment differ from that of adults who have completed specialty treatment?
5. How can local communities establish baseline recovery prevalence data that can be used to guide and evaluate recovery-focused systems-transformation efforts?

## **THE CHALLENGES OF RECOVERY MEASUREMENT**

Establishing a recovery rate or a recovery prevalence figure is fraught with innumerable challenges. First is the question: What is recovery, and by what criteria is this status achieved or lost? In their broadest terms, the earlier-cited efforts to define recovery have focused on three broad criteria: 1) reduction of AOD problems to subclinical levels either through abstinence or deceleration of the frequency, intensity, and consequences of AOD use; 2) improvements in global health; and 3) pro-social community reintegration (e.g., reduced injury to community, enhanced citizenship). These criteria reinforce the notion of recovery as more than the removal of alcohol and drugs from an otherwise unchanged life. They further reflect the finding that some individuals who have achieved sustained abstinence following alcohol or other drug dependence remain substantially impaired in terms of their physical health, emotional health, and interpersonal functioning.<sup>4</sup>

Few studies have measured recovery prevalence based on a systematic analysis of all three of these criteria. In fact, many of the studies we will review focus, not on the measurement of recovery itself, but on the study of the general trajectory of AOD problems, the measurement of treatment outcomes, or the study of relapse. With some very notable exceptions, recovery has been an afterthought rather than a subject of focused study.

Terms such as “recovery,” “remission,” “resolution,” and “improved” pervade the studies we will review, but each researcher defines these terms differently, and each person reading such terms may understand their meaning differently. Early studies were unclear about the

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<sup>4</sup> De Soto, C. B., O'Donnel, W. E., & De Soto, J. L. (1989). Long-term recovery in alcoholics. *Alcoholism: Clinical and Experimental Research*, 13, 693-697. Gerard, D., Sanger, G., & Wile, R. (1962) The abstinent alcoholic. *Archives of General Psychiatry*, 6, 83-95. Pattison, E. M., Headley, E. B., Gleser, G. C., & Gottschalk, L. A. (1968). Abstinence and normal drinking: An assessment of change in drinking patterns to alcoholics after treatment. *Quarterly Journal of Studies on Alcohol*, 29, 610-633.

condition to which the term “recovery” was applied, e.g., AOD users or ill-defined terms such as “problem drinkers,” “alcoholics,” and “addicts.” Some studies using DSM diagnostic criteria included both abuse and dependence populations and did not diagnostically distinguish their reported recovery/remission rates, while other studies focused only on abuse or only on dependence populations. Varying levels of problem type and severity also make it difficult to compare recovery rates across studies. Recovery prevalence figures are further confounded by researchers who use the terms remission or recovery to apply to a reduction in AOD use among persons who may not have met prior diagnostic criteria for substance use disorders.<sup>5</sup>

Terms such as “abstinence,” “sobriety,” and “clean” (or “clean time” used within American communities of recovery) would appear on the surface to have clear meanings, but this is not the case when such terms appear in research reports. In the latter world, as Dr. George Vaillant suggests, “abstinence is a relative term.”<sup>6</sup> Abstinence across these studies may vary in meaning to include:

- continuous abstinence from a primary drug over the follow-up period,
- essential (virtual, partial, near) abstinence—not having consumed more than a specified amount of alcohol or particular drugs during the follow-up period, e.g., averaging less than 1 drink per month;<sup>7</sup>
- minimal abstinence—having achieved a minimum period of recovery status during the follow-up period, e.g., having refrained from consuming heroin for a minimum of 3 months within a 2-year follow-up study;
- point-in-time abstinence—not consuming alcohol or particular drugs at the time of follow-up contact;
- complete abstinence—continuous abstinence from a primary drug, with no use or asymptomatic use of other drugs during the follow-up period; and
- involuntary versus voluntary abstinence—presence or absence of enforced abstinence via hospitalization or incarceration.<sup>8</sup>

Recovery rates and recovery prevalence figures obviously vary depending on the abstinence definition used. It is also noteworthy that persons achieving abstinence following addiction may or may not improve the overall quality of their adjustment/functioning, although

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<sup>5</sup> Cunningham, J. A. (1999b). Untreated remission from drug use: The predominant pathway. *Addictive Behaviors*, 24(2), 267-270. Misch, D. A. (2007). “Natural recovery” from alcohol abuse among college students. *Journal of American College Health*, 55(4), 215-218.

<sup>6</sup> Vaillant, G. E. (1966c). A twelve-year follow-up of New York narcotic addicts: IV. Some characteristics and determinants of abstinence. *American Journal of Psychiatry*, 123(5), 573-584.

<sup>7</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779. Bergmann, P. E., Smith, M. B., & Hoffman, N. G. (1995). Adolescent treatment: Implications for assessment, practice guidelines, and outcome management. *Pediatric Clinics of North America*, 42, 453-472.

<sup>8</sup> Duvall, H. J., Lock, B. Z., & Brill, L. (1963). Follow-up study of narcotic drug addicts five years after hospitalization. *Public Health Reports*, 78, 185-193.

the number of persons abstinent who continue to function poorly decreases with length of abstinence.<sup>9</sup> Recovery research is progressing beyond a narrow concern with the duration and stability of abstinence or remission toward an increased focus on quality of personal and family life in long-term recovery.<sup>10</sup>

In research the term “recovery” is often used synonymously with the term “remission”—the latter meaning that the person once met DSM-IV diagnostic criteria for a substance use disorder but has not met such criteria in the past year. Information cited in this paper will include total remission rate and, where possible, subcategories of abstinence-based remission and remission through asymptomatic use, e.g., use without problems that reach diagnostic criteria. This latter pattern is reported in the literature under various names, e.g., “controlled drinking,” “normal drinking,” “social drinking,” “asymptomatic use,” “subclinical use,” “non-abstinent remission,” “non-problematic drinking,” “non-destructive drinking,” “non-hazardous drinking,” and “marked improvement”—each with its own definition and the possibility that the definition will vary from study to study.<sup>11</sup>

Recovery/remission prevalence can also sometimes be reported in terms of full remission (no longer meeting diagnostic criteria) or partial remission (meeting diagnostic criteria but at a lower level of problem severity). The latter is also sometimes reported as “improved” or “at-risk use” (use pattern at high risk to re-accelerate into a substance use disorder). Further complicating the issue of recovery measurement are studies that neither report abstinence nor remission rates, but instead report increase or decrease in a particular pattern of use (e.g., change in the percentage of treated clients who use heroin daily) without noting the proportion of the sample that achieved abstinence or no longer met diagnostic criteria for substance use disorders at follow-up.<sup>12</sup> Still other studies report high success rates based on a single area of functioning, without a detailed analysis of global functioning (e.g., Spicer’s and Owen’s 1985 report that 75% of employed alcoholics returned to normal productivity following treatment).<sup>13</sup>

It should be clear from this brief discussion that the research community has reached no consensus on measurement criteria for recovery. Researchers have answered that question through measurement of such dimensions as continual abstinence; quantity, frequency, and intensity of AOD use; length of time to resumed use following treatment; measures of AOD-related personal/family problems; changes in social costs and threats to public safety related to

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<sup>9</sup> Pettinati, H. M., Sugarman, A. A., DiDonata, N., & Maurer, H. S. (1982). The natural history of alcoholism over four years after treatment. *Journal of Studies on Alcohol*, 43, 201-205.

<sup>10</sup> Longabaugh, R., Mattson, M. E., Connors, G. J., & Cooney, N. L. (1994). Quality of life as an outcome variable in alcoholism treatment research. *Journal of Studies on Alcohol Supplement*, 12, 119-129.

<sup>11</sup> Russell, M., Pierce, R. S., Chan, A. W. K., Wiczorek, W. F., Moscato, B. S., & Nochajski, T. H. (2001). Natural recovery in a community sample of alcoholics: Study design and descriptive data. *Substance Use and Misuse*, 36(11), 1417-1441.

<sup>12</sup> Hubbard, R. L., Cavanaugh, E. R., Craddock, S. G., & Rachal, J. V. (1985). Characteristics, behaviors and outcomes for youth in the TOPS. In A. A. Friedman & G. M. Beschner (Eds.), *Treatment services for adolescent substance abusers* (pp. 49-65). Rockville, MD: National Institute on Drug Abuse.

<sup>13</sup> Spicer, J., & Owen, P. (1985). *Finding the bottom line: The cost impact of employee assistance and chemical dependency treatment programs*. Center City, MN: Hazelden Foundation.

continued use; changes in status on diagnostic criteria for substance use disorders; and broader measures of global health and quality of life.<sup>14</sup>

Reflecting that diversity of measurement, the studies highlighted in this paper use a wide variety of recovery measures, including continual abstinence; abstinence at follow-up; abstinence for a minimum length of time preceding follow-up; quantity, frequency, and intensity of AOD use; the amount of time to resumed use following a helping intervention; measures of AOD-related personal/family problems; changes in AOD use linked to social costs (e.g., arrests, hospitalizations) and threats to public safety related to continued use (e.g., needle sharing, drinking and driving); changes in status on diagnostic criteria for substance use disorders; and broader measures of global health and quality of life.<sup>15</sup> Reported studies also vary widely on length of follow-up, recovery inclusion criteria (meeting criteria continuously over the follow-up period, meeting criteria for a set period of time before follow-up, or meeting criteria the day of follow-up), method of rate calculation (e.g., based on percentage of total original sample or percentage of the follow-up sample), and the degree of verification of recovery status (e.g., self-report only, collateral verification, verification via chemical testing). All of these factors are potential influences on reported rates of recovery.

There is also little agreement on how long a state of improved health must be maintained before recovery status can be assumed to be stable. Reported prevalence rates based on a point-in-time follow-up status or a minimum of three or six months meeting particular recovery criteria differ from rates based on continuous maintenance of that state for five years. The assumption of when recovery is stable and durable—when present recovery status is predictive of lifetime recovery status—varies markedly across the studies we will review.

These opening points represent a way of informing the reader unfamiliar with these studies that conceptual, linguistic, and methodological barriers arise in our attempts to answer questions about recovery rates and recovery prevalence. Reports of the proportion of persons with AOD problems who achieve stable remission/recovery vary considerably based on different population samples (e.g., community versus clinical populations), stringency of problem

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<sup>14</sup> Babor, T. F., Longabaugh, R., Zweben, A., Fuller, R. K., Sout, R. L., Anton, R. F., & Randall, C. L. (1994). Issues in the definition and measurement of drinking outcomes in alcoholism treatment research. *Journal of Studies on Alcohol*, Supplement 12, 101-111. Longabaugh, R., Mattson, M. E., Connors, G. J., & Cooney, N. L. (1994). Quality of life as an outcome variable in alcoholism treatment research. *Journal of Studies on Alcohol Supplement*, 12, 119-129. Sobell, L. C., Sobell, M. B., Connors, G. J., & Agrawal, S. (2003). Assessing drinking outcomes in alcohol treatment efficacy studies: Selecting a yardstick of success. *Alcoholism: Clinical and Experimental Research*, 27, 1661-1666.

<sup>15</sup> Babor, T. F., Longabaugh, R., Zweben, A., Fuller, R. K., Sout, R. L., Anton, R. F., & Randall, C. L. (1994). Issues in the definition and measurement of drinking outcomes in alcoholism treatment research. *Journal of Studies on Alcohol*, Supplement 12, 101-111. Longabaugh, R., Mattson, M. E., Connors, G. J., & Cooney, N. L. (1994). Quality of life as an outcome variable in alcoholism treatment research. *Journal of Studies on Alcohol Supplement*, 12, 119-129. Sobell, L. C., Sobell, M. B., Connors, G. J., & Agrawal, S. (2003). Assessing drinking outcomes in alcohol treatment efficacy studies: Selecting a yardstick of success. *Alcoholism: Clinical and Experimental Research*, 27, 1661-1666. Sobell, M. B., Sobell, L. C., & Gavin, D. R. (1995). Portraying alcohol treatment outcomes: Different yardsticks of success. *Behavior Therapy*, 26, 643-669.

definition, degree of problem severity, definitions of remission and recovery, and length of follow-up.<sup>16</sup>

## **A PROBLEM OF POPULATION DIVERSITY**

There is considerable disagreement between addiction treatment clinicians and community researchers on the long-term course of alcohol and other drug problems. This is due in great part to the differences in etiology, patterns, and outcomes of AOD problems between treatment populations and larger community populations. As early as 1970, Cahalan and Room, based on their study of problem drinking among American men, cautioned policy makers concerned with such problems against assuming “that the target population is simply the institutional population writ large.”<sup>17</sup>

Clinicians who see the most severe, complex, and chronic AOD problems are prone to assume that the problems they see clinically are the tip of an iceberg of similar problems in the larger community that has yet to reach them. They tend to see these problems as progressive, chronically relapsing disorders that can be resolved only through professional treatment and permanent abstinence. Cohen and Cohen<sup>18</sup> christened this worldview of AOD problems as the “clinician’s illusion.” The problem with the clinician’s lens is that only a small percentage (1-3%) of the general population exhibits drinking patterns at levels reported by those entering treatment for alcohol use disorders.<sup>19</sup> This suggests that knowledge of alcohol and drug problems gained in the treatment setting may have only limited applicability to the broader range of such problems in the community.

Epidemiologists who study the trajectory of AOD problems in larger community populations reveal the course of such problems for the 75-90% of affected people who do not seek specialty treatment.<sup>20</sup> These scientists tend to see AOD problems as inherently self-limiting (rather than progressive), resolvable through natural internal and external resources

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<sup>16</sup> Cunningham, J. A. (1999). Untreated remissions from drug use: The predominant pathway. *Addictive Behaviors*, 24, 267-270.

<sup>17</sup> Cahalan, D., & Room R. (1970). *Problem drinking among American men*. New Brunswick, NJ: Rutgers Center of Alcohol Studies.

<sup>18</sup> Cohen, P., & Cohen J. (1984). The clinician’s illusion. *Archives of General Psychiatry*, 41, 1178-1182.

<sup>19</sup> Room, R. (1968, September). *Amount of drinking and alcoholism*. Paper prepared for the 28<sup>th</sup> International Congress on Alcohol and Alcoholism, Washington, DC. Polich, J. M., Armor, D. J., & Braiker, H. B. (1980). *The course of alcoholism: Four years after treatment*. New York: Wiley.

<sup>20</sup> Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, correlates, disability and comorbidity of DSM-IV alcohol abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and related conditions. *Archives of General Psychiatry*, 64(7), 830-842. Substance Abuse and Mental Health Services Administration. (2003). *Results from the 2002 National Survey on Drug Use and Health: National findings* (Office of Applied Studies, NHSDA Series H-22, DHHS Publication No. SMA 03-3836). Rockville, MD: Author. Regier, D. A., Narrow, W. E., Rae, D. S., Manderscheid, R. W., Locker, B. Z., & Goodwin, F. K. (1993). The de facto US mental and addictive disorder service system: Epidemiologic Catchment Area prospective 1-year prevalence rates of disorders and services. *Archives of General Psychiatry*, 50, 85-94.



(rather than only through professional treatment), and often resolved through a deceleration of the frequency and intensity of use (rather than through complete and enduring abstinence).<sup>21</sup> Moos and Finney<sup>22</sup> christened this worldview of AOD problems the “epidemiologist’s illusion.”

The widely differing views of addiction and recovery across clinical and community realms is particularly evident in the portrayal of relapse among those seeking recovery. In the clinical world of addiction treatment, relapse is defined as a normal part of the chronic nature of addiction. Addiction treatment professionals can regularly be heard purporting that “relapse is a normal part of the recovery process” (See White, 2010 for discussion).<sup>23</sup> Such communications contribute to the public perception that recovery is a process of trying to stop using alcohol and other drugs rather than a stable, achieved state.<sup>24</sup> And yet community surveys of the recovery community reveal that most people in recovery from alcohol and other drug problems either experienced no AOD use (54%) or only a single brief episode of such use (16%) following recovery initiation.<sup>25</sup> The clinician’s pessimism and the epidemiologist’s optimism constitute the “two worlds” of AOD problems.<sup>26</sup> Any discussion about measuring and reporting prevalence and styles of long-term recovery must be based on an understanding of the highly variable course of AOD problems and the differences in resolution frequency and resolution methods across these two worlds.

In summary, conclusions drawn from studies of persons in addiction treatment cannot be indiscriminately applied to the wider pool of AOD problems in the community, nor can findings from community studies be indiscriminately applied to the population of treatment seekers. Prolonged repetitions of the abstinence-relapse cycle are not typical in community populations, although they are typical for a subset of the clinical population characterized by high problem severity/complexity and low recovery capital.<sup>27</sup> Most (as many as 75%) people who resolve alcohol-related problems do so without formal treatment.<sup>28</sup> Those who seek help for such

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<sup>21</sup> Fillmore, K. M. (1974). Drinking and problem drinking in early adulthood and middle age: An exploratory 2-year follow-up study. *Quarterly Journal of Studies on Alcohol*, 35, 819-840. Kandel, D., & Logan, J. A. (1984). Patterns of drug use from adolescence to young adulthood: I. Periods of risk for initiation, continued use and discontinuation. *American Journal of Public Health*, 74, 660-666. Temple, M. T., & Fillmore, K. M. (1985-1986). The variability of drinking patterns and problems among young men, age 16-31: A longitudinal study. *International Journal of the Addictions*, 20, 1595-1620.

<sup>22</sup> Moos, R. H., & Finney, J. W. (2011). Commentary on Lopez-Quintero et al. (2011). Remission and relapse—the Yin-Yang of addictive disorders. *Addiction*, 106, 670-671.

<sup>23</sup> White, W. (2010). *Relapse is NOT a part of recovery*. Posted at "<http://www.facesandvoicesofrecovery.org>" [www.facesandvoicesofrecovery.org](http://www.facesandvoicesofrecovery.org) and "<http://www.williamwhitepapers.com>" [www.williamwhitepapers.com](http://www.williamwhitepapers.com)

<sup>24</sup> Office of Communications (2008). *Summary Report CARAVAN Survey for SAMHSA on Addictions and Recovery*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

<sup>25</sup> Peter D. Hart Associates (2001). *The Face of Recovery, October 2001*. Washington DC: Faces and Voices of Recovery.

<sup>26</sup> Storbjork, J., & Room, R. (2008). The two worlds of alcohol problems: Who is in treatment and who is not? *Addiction Research and Theory*, 16(1), 67-84.

<sup>27</sup> Price, R. K., Risk, N. K., & Spitznagel, E. L. (2001). Remission from drug abuse over a 25 year period: Patterns of remission and treatment use. *American Journal of Public Health*, 91, 1107-1113.

<sup>28</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779. Hasin, D.,

problems are the exception. For example, Dawson et al.<sup>29</sup> reported from a national U.S. community sample that 3.1% of persons meeting lifetime criteria for alcohol dependence had attended 12-Step meetings, 5.4% had had treatment only, and 17% had participated in both 12-Step meetings and treatment.

Adults and adolescents entering specialized addiction treatment are distinguished by:

- greater personal vulnerability (e.g., male gender, family history of substance use disorders, child maltreatment, early pubertal maturation, early age of onset of AOD use, personality disorder during early adolescence, less than high school education, substance-using peers, and greater cumulative lifetime adversities),
- greater problem severity (e.g., longer duration of use, dependence, polysubstance use, abuse symptoms co-occurring with substance dependence; opiate dependence),
- greater problem intensity (frequency, quantity, high-risk methods of ingestion, and high-risk contexts),
- greater AOD-related consequences (e.g., greater AOD-related legal problems),
- higher rates of developmental trauma and post-traumatic stress disorder,
- higher co-occurrence of other medical/psychiatric illness,
- more significant personal and environmental obstacles to recovery, and
- lower levels of recovery capital—internal and external resources available to initiate and sustain long-term recovery.<sup>30,31</sup>

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Liu, X., & Paykin, A. (2001). DSM-IV alcohol dependence and sustained reduction in drinking: Investigation in a community sample. *Journal of Studies on Alcohol*, 62, 509-517. Grant, B. F. (1997). Barriers to alcoholism treatment: Reasons for not seeking treatment in a general population sample. *Journal of Studies on Alcohol*, 58, 365-371. Kessler, R., McGonagle, K., Zhao, S., Nelson, C., Hughes, M., Eshelman, S.,... Kendler, K. (1994). Lifetime and 12-month prevalence of DSM-II-R psychiatric disorders in the United States. *Archives of General Psychiatry*, 51, 8-19. Lopez-Quintero, C., Hason, D. J., de los Cobas, J. P., Pines, A., Wang, S., Grant, B. F., & Blanco, C. (2010). Probability and predictors of remission from life-time nicotine, alcohol, cannabis or cocaine dependence: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Addiction*, 106(3), 657-669. Schutte, K. K., Moos, R. H., & Brennan, P. L. (2006). Predictors of untreated remission from late-life drinking problems. *Journal of Studies on Alcohol*, 67, 354-362. Sobell, L. C., Cunningham, J. A., & Sobell, M. B. (1996). Recovery from alcohol problems with and without treatment: Prevalence in two population surveys. *American Journal of Public Health*, 86(7), 966-972.

<sup>29</sup> Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2006). Estimating the effect of help-seeking on achieving recovery from alcohol dependence. *Addiction*, 101, 824-834.

<sup>30</sup> Edens, E. L., Glowinski, A. L., Grazier, K. L., & Bucholz, K. K. (2008). The 14-year course of alcoholism in a community sample: Do men and women differ? *Drug and Alcohol Dependence*, 93, 1-11. Warner, L. A., White, H. R., & Johnson, V. (2007). Alcohol initiation experiences and family history of alcoholism as predictors of problem-drinking trajectories. *Journal of Studies on Alcohol*, 68, 56-65. King, K. M., & Chassin, L. (2007). A prospective study of the effects of age of initiation of alcohol and drug use in young adult substance dependence. *Journal of Studies on Alcohol and Drugs*, 68, 256-265. Kuramoto, S.J., Martins, S.S., Ko, J.Y. & Chilcoat, H.D. (2011). Past year treatment status and alcohol abuse symptoms among U.S.adults

The stability of remission without formal treatment varies by sample and length of follow-up, but some studies report high rates of stability. Rumpf and colleagues, in a 24-month follow-

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with alcohol dependence. *Addictive Behaviors*, 36, 648-653; Grant, B. F. (1996). Toward an alcohol treatment model: A comparison of treated and untreated respondents in a general population sample. *Alcoholism: Clinical and Experimental Research*, 20, 372-378. Grant, B. F. (1997). Barriers to alcoholism treatment: Reasons for not seeking treatment in a general population sample. *Journal of Studies on Alcohol*, 58, 365-371. Bischof, G., Rumpf, H., Myer, C., Hapke, U., & John, U. (2004). What triggers remission without formal help from alcohol dependence? Findings from the TACOS-Study. In P. Rosenqvist, J. Blomqvist, A. Koski-Jannes, & L. Ojesjo (eds.), *Addiction and life course. NAD Monograph No. 44* (pp. 85-101). Helsinki Finland: Nordic Council for Alcohol and Drug Research. Kadri, A. M., Bhagylaxmi, A., & Kedia, G. (2003). Study of socio-demographic profile of substance users attending a de-addiction centre in Ahmedabad city. *Indian Journal of Community Medicine*, 28(2), 74-76. Grella, C. E., & Joshi, V. (1999). Gender differences in drug treatment careers among clients in the national drug abuse treatment outcome study. *American Journal of Drug and Alcohol Abuse*, 25(3), 385-406. Grella, C.E., Hser, Y.I., & Hsieh, S-C (2003). Predictors of drug treatment re-entry following relapse to cocaine use in DATOS. *Journal of Substance Abuse Treatment*, 25, 145-154. Ross, H. E., Lin, E., & Cunningham, J. (1999). Mental health service use: A comparison of treated and untreated individuals with substance use disorders in Ontario. *Canadian Journal of Psychiatry*, 44(6), 570-577. Costello, E. J., Sung, M., Worthman, C., & Angold, A. (2007). Pubertal maturation and the development of alcohol use and abuse. *Drug and Alcohol Dependence*, 88, S50-S59. Granfield, R., & Cloud, W. (1999). *Coming clean: Overcoming addiction without treatment*. New York: New York University Press. Schmidt, L. A., & Weisner, C. M. (2005). Private insurance and the utilization of chemical dependency treatment. *Journal of Substance Abuse Treatment*, 28, 67-76. Duffy, S. Q., Cowell, A. J., Council, C., & Shi, W. (2006). Formal treatment, self-help, or not treatment for alcohol use disorders? Evidence from the National Household Survey on Drug Abuse. *Journal of Studies on Alcohol*, 67, 363-372. Leichtling, G., Gabriel, R. M., Lewis, C. K., & Vander Ley, K. J. (2006). Adolescents in treatment: Effects of parental substance abuse on treatment and entry characteristics and outcomes. *Journal of Social Work Practice in the Addictions*, 6(1/2), 155-174. Norman, S. B., Tate, S. R., Anderson, K. G., & Brown, S. A. (2007). Do trauma and PTSD symptoms influence addiction relapse context? *Drug and Alcohol Dependence*, 90, 89-96. Schutte, K. K., Moos, R. H., & Brennan, P. L. (2006). Predictors of untreated remission from late-life drinking problems. *Journal of Studies on Alcohol*, 67, 354-362. Hamburger, M. E., Leeb, R. T. & Swahn, M. H. (2008). Childhood maltreatment and early alcohol use among high-risk adolescents. *Journal of Studies on Alcohol and Drugs*, 69, 292-295. Lloyd, D. A., & Turner, R. J. (2008). Cumulative lifetime adversities and alcohol dependence in adolescence and young adulthood. *Drug and Alcohol Dependence*, 93, 217-226. Hingson, R. W., Heeren, T., & Edwards, E. M. (2008). Age at drinking onset, alcohol dependence, and their relation to drug use and dependence, driving under the influence of drugs, and motor-vehicle crash involvement because of drugs. *Journal of Studies on Alcohol and Drugs*, 69, 192-201. Moos, H. B., Chen, C. M., & Yi, H.-Y. (2007). Subtypes of alcohol dependence in a nationally representative sample. *Drug and Alcohol Dependence*, 91, 149-158. Cohen, P., Chen, H., Crawford, T. N., Brook, J. S., & Gordon, J. (2007). Personality disorders in early adolescence and the development of later substance use disorders in the general population. *Drug and Alcohol Dependence*, 88, S71-S84.

<sup>31</sup> The only major exception to these findings is a study by Carroll and Rounsaville (1992) that found remarkably similar levels of problem severity and complexity in a comparison of cocaine users in the community and those entering treatment. Carroll, K. M., & Rounsaville, B. J. (1992). Contrast of treatment-seeking and untreated cocaine abusers. *Archives of General Psychiatry*, 49, 464-471.

up of a German community sample of people who had remitted from alcohol dependence without professional help, found a 91% remission rate at follow-up.<sup>32</sup>

As we proceed, we will try to distinguish carefully what we know about the resolution of AOD problems across community and clinical populations. Put simply, rates of recovery vary significantly across levels of problem severity, complexity, and duration.<sup>33</sup> Prediction of recovery rates, whether for individuals or for communities, must be based on understanding of this principle. A portion of persons with AOD problems moves in and out of such problem states over relatively short periods<sup>34</sup> and throughout longer periods of their lives.<sup>35</sup> Also blurring these boundaries are scientific studies of “treated” and “untreated” populations, studies whose definition of treatment differ, e.g., differences in whether participation in such activities as brief advice, detoxification, counseling not focused on addiction treatment, or participation in recovery mutual aid societies are included within the rubric of “treatment.” In short, those who have participated in AA, NA, or another recovery support group could be included in a community (“untreated”) population in one study and a “treated” population in another study. Caution is the watchword as we proceed to summarize what we know about recovery prevalence across these two overlapping worlds.

## METHODOLOGY

The starting goal of this analysis was to identify 400+ scientific studies that reported rates of recovery from substance use disorders. By design, those selected represent:

- the more than 150 years over which such studies have been conducted (from the 1860s to the present),
- diverse national contexts (including the U.S., Australia, Canada, Denmark, England, Germany, Holland, Scotland, Sweden, and South Africa),
- diverse cultural contexts (including multiple studies with primarily African American, Native American, and Hispanic samples),

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<sup>32</sup> Rumpf, H.-J., Bischof, G., Hapke, U., Meyer, C., & John, U. (2006). Stability of remission from alcohol dependence without formal help. *Alcohol and Alcoholism*, 41(3), 311-314. doi:10.1093/alcalc/agl008

<sup>33</sup> Cunningham, J. A. (1999). Resolving alcohol-related problems with and without treatment: The effects of different problem criteria. *Journal of Studies on Alcohol*, 60, 463-466.

<sup>34</sup> Booth, B. M., Fortney, S. M., Fortney, J. C., Curran, G. M., & Kirchner, J. E. (2001). Short-term course of drinking in an untreated sample of at-risk drinkers. *Journal of Studies on Alcohol*, 62, 580-588.

<sup>35</sup> Ray, M. (1961). The cycle of abstinence and relapse among heroin addicts. *Social Problems*, 9, 132-140. Ray, M. B. (1968). Abstinence cycles and heroin addicts. In E. Rubington & M. Weinberg (Eds.), *Deviance: The interactionist perspective* (pp. 484-492). London: Macmillan. Scott, C. K., Foss, M. A., & Dennis, M. L. (2005). Pathways in the relapse-treatment-recovery cycle over 3 years. *Journal of Substance Abuse Treatment*, 28(Supplement 1), S63-S72. Schuckit, M. A., Tipp, J. E., & Bucholz, K. K. (1997). Periods of abstinence following onset of drug dependence in 1,853 men and women. *Journal of Studies on Alcohol*, 58, 581-589. Watson, C. G., & Pucel, J. (1985). The consistency of posttreatment alcoholics' drinking patterns. *Journal of Consulting and Clinical Psychology*, 53, 679-683.

- untreated community populations (70+ studies) and treated populations (200+ studies),
- a wide spectrum of primary drug choices,
- all levels of care and a wide diversity of treatment methods, and
- multiple subpopulations (e.g., adolescents, older adults, women, physicians, homeless people, people with co-occurring psychiatric illness).

The goal was to be as inclusive as possible in reporting the recovery outcomes of diverse populations treated in diverse settings through the widest spectrum of methods. The goal was not to identify the best methods of treatment or to report recovery outcomes in the most controlled conditions. Rather, it was to report recovery outcomes across ALL populations, methods, and settings and to report on rates of recovery outcomes with and without professional treatment.

The studies were identified through standard computer literature searches (e.g., PubMed, ETOH, PsychInfo) conducted by the author and research assistants Stephanie Merkle and Barbara Weiner. Also reviewed was the collection of treatment outcome studies housed at the Illinois Addiction Studies Archives. Those studies that reported a measurable prevalence or rate of recovery were organized into three master tables (community studies, adult clinical studies, and adolescent clinical studies—See Appendices A-C). These raw data were then analyzed by research associate Rod Funk to construct graphs and tables illustrating the major findings that will appear below.

The recovery rates presented in the tables are based on varying definitions of remission, recovery, improvement, and success. As noted, they represent different methods of rate calculations, with some recovery rates based on a percentage of the total original samples and others calculated on graduates or survivors at follow-up. Some report rates for multiple subgroups without reporting a rate for all study participants. For these studies, the rate reported in this analysis is the average of the reported means across study subgroups. If a study reported only a recovery rate range (e.g., between 40 and 50%), the rate listed for that study was the average within that range (e.g., 45%). Where remission/recovery rates were reported for multiple points of follow-up, the figure reported here is for the remission/recovery rate at the last point of follow-up.

In discussing the available data, we will use two terms: “recovery prevalence” and “recovery rate.” As used here, “recovery prevalence” will indicate the number of people in a given population who have met diagnostic criteria for DSM-IV substance use disorders at some point in their lives but who have not met diagnostic criteria for at least the past year. “Recovery rate” will indicate the percentage of people who have had SUDs at some point in their lives but who do not meet SUD diagnostic criteria at follow-up or for a specified time period—usually reported as an annual or lifetime rate. We will focus in this paper primarily on lifetime recovery rates.

## COMMUNITY STUDIES

We will start our discussion of the natural course of AOD problems with studies of the natural course of AOD use in the general population of the United States.

**The NSDUH and MTF Studies of AOD Desistance Patterns:** There are two major surveys used to track substance use trends in the United States—the National Survey on Drug Use and Health (NSDUH) and the Monitoring the Future (MTF) youth survey. For each year the NSDUH provides estimates on the prevalence of “substance abuse and dependence” in the general population (22.2 million persons in 2008), the number of people in need of AOD-related treatment (23,051,000—slightly larger than the clinical SUD population), and the number of people who received AOD-related treatment (2,287,000 at a specialty facility), but it does not measure recovery prevalence in the general population.<sup>36</sup> In other words, these surveys can reveal patterns of AOD cessation or reduced frequency of use, but not the portions of such changes that occur in persons who previously experienced substance use disorders. These surveys do provide data on selected patterns of drug desistance, which can be obtained by comparing self-reported lifetime use rates with past-year use rates for particular drugs for youth and young adults (See Table 1).

**Table 1: Cessation Patterns among Youth and Young Adults in 2009: Lifetime versus Past-Year Use Rates<sup>37</sup>**

Substance	Age 12-17 NSDUH 2009	Age 12-17 MTF 2009	Age 18-25 NSDUH	Age 18-25 MTF 2009
Alcohol	38.1 / 30.3	47.9 / 41.6	85.8 / 78.8	85.7 / 82.0
Cigarettes	22.2 / 15.0	26.4 / NA	63.7 / 45.2	NA / 35.0
Marijuana	17.0 / 13.6	24.0 / 19.3	52.2 / 30.6	53.8 / 32.1
Cocaine	1.6 / 1.0	3.6 / 2.2	14.8 / 5.3	12.2 / 5.7

In 2008, 48.9% of persons aged 18 or older reported lifetime use of illicit drugs, but only 13.7% of those surveyed reported illicit drug use in the past year.<sup>38</sup> The portion of these desistance patterns for youth, young adults, and older adults resulting from recovery from a

<sup>36</sup> Substance Abuse and Mental Health Services Administration. (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD., Figure 7.1; Table G.32.

<sup>37</sup> Substance Abuse and Mental Health Services Administration. (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD.

<sup>38</sup> Substance Abuse and Mental Health Services Administration. (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD., Table G.13.

substance use disorder versus a cessation of early drug experimentation is, as we noted, unknown. Surveys outside the United States reveal similar trends. In a Canadian population survey, Cunningham<sup>39</sup> found cessation rates (drug use in lifetime but not in past year) ranging in the 80<sup>th</sup> percentile for cocaine, LSD, amphetamines, and heroin.

Studies of heavy and binge drinking among college students also confirm that only a small percentage of students maintain harmful drinking as a continuous pattern over time. For example, Weingardt and colleagues<sup>40</sup> studied drinking patterns of college students over time and found that only 18.5% of college students continued to meet binge drinking criteria over a span of four years. Vik and colleagues<sup>41</sup> found that 22% of students with a history of binge drinking in adolescence reduced their drinking during their college years and did so without formal treatment.

There is natural momentum toward reduction/cessation of illicit drug use in the transition from adolescence into adulthood.<sup>42</sup> Decelerated use, cessation of use, and recovery for adolescents are intertwined with maturational transitions into adulthood, e.g., completing high school, leaving home, marriage or cohabitation, full-time employment, paying bills, and having children.<sup>43</sup> Community studies also reveal a second wave of decline in alcohol use and related problems after age 50.<sup>44</sup>

While most desistance studies do not provide a basis for calculating recovery prevalence, they do underscore the natural trend toward a deceleration of AOD use over time in most individuals—a broad trend that we shall soon see also applies to clinical as well as community populations. At the community level those who follow patterns of desistance also blend into the larger pool of abstainers who never used alcohol or drugs, or who once used but no longer use such substances. Over the past 40 years, studies of drinking patterns in the U.S. have generally found about a third of the population reporting that they do not consume

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<sup>39</sup> Cunningham, J. A. (1999). Untreated remissions from drug use: The predominant pathway. *Addictive Behaviors*, 24, 267-270.

<sup>40</sup> Weingardt, K. R., Baer, J. S., Kivlahan, D. R., Roberts, L. J., Miller, E. T., & Marlatt, G. A. (1998). Episodic heavy drinking among college students: Methodological issues and longitudinal perspectives. *Psychology of Addictive Behaviors*, 12, 155-167.

<sup>41</sup> Vik, P. W., Celluci, T., & Ivers, H. (2003). Natural reduction of binge drinking among college students. *Addictive Behaviors*, 28, 643-655.

<sup>42</sup> Kandel, D. B., & Raveis, V. H. (1989). Cessation of illicit drug use in young adulthood. *Archives of General Psychiatry*, 46, 109-116.

<sup>43</sup> D'Amico, E. J., Ramchand, R., & Miles, J. N. V. (2009). Seven years later: Developmental transitions and delinquent behavior for male adolescents who received long-term substance treatment. *Journal of Studies on Alcohol*, 70, 641-650. Gotham, H. J., Scher, K. J., & Wood, P. K. (1997). Predicting stability and change in frequency of intoxication from the college years to beyond: Individual-difference and role transition variables. *Journal of Abnormal Psychology*, 106, 619-629. Muthén, B. O., & Muthén, L. K. (2000). The development of heavy drinking and alcohol-related problems from ages 18 to 37 in a US national sample. *Journal of Studies on Alcohol*, 61, 290-300. Schulenberg, J., O'Malley, P. M., Bachman, J. G., Wadsworth, K. N., & Johnston, L. D. (1996). Getting drunk and growing up: Trajectories of frequent binge drinking during the transition to young adulthood. *Journal of Studies on Alcohol*, 57, 289-304.

<sup>44</sup> Cahalan, D., & Room, R. (1972). Problem drinking among American men aged 21-59. *American Journal of Public Health*, 62, 1473-1482.

alcohol—a mixture of those who never drank and former drinkers who once had or did not have a problem with alcohol but today choose not to drink.<sup>45</sup>

Cahalan, Cisin, and Crossley<sup>46</sup> found that five percent of current drinkers reported earlier histories of heavy drinking, but it is unclear what percentages of these heavy drinkers met diagnostic criteria for an alcohol use disorder. It is likely that many of the same factors that contribute to trends toward deceleration or cessation of drug use over time in the general population (e.g., maturation, competing activities and priorities, boredom with AOD use, untoward consequences of AOD use, fear of future consequences of AOD use, family or social pressure, and religious or spiritual experiences) also operate, perhaps in magnified form, among those with substance use disorders.<sup>47</sup>

In summary, while there is an age-related migration toward reduced consumption in the long run, those with the heaviest patterns of AOD use in mid-adolescence (ages 15-16) are most likely to remain among those who consume the most in early adulthood (ages 24-25) and beyond.<sup>48</sup>

Studies of AOD Problems in Community Populations: Community-based studies of the course of AOD problems began in the United States in the 1950s, although the modern era of alcohol epidemiology might well be said to have started with the studies of Clark, Cahalan, and Room<sup>49</sup> in the late 1960s and 1970s. These were among the first studies to reveal the instability in alcohol problem status over time among non-clinical populations.

In reviewing community studies of recovery prevalence, we will rely on reports from the Epidemiologic Catchment Area Study, the National Comorbidity Survey, the National Health Interview, the National Longitudinal Alcohol Epidemiologic Survey, and the National Epidemiologic Survey on Alcohol and Related Conditions; on a review of recovery prevalence rates drawn from 79 published U.S. community surveys on the course of substance-related disorders; and on a 2010 recovery survey conducted by the Public Health Management Corporation in Philadelphia and six surrounding counties.

The Epidemiologic Catchment Area (ECA) Study: Robins, Locke, and Regier<sup>50</sup> summarized data from a study of the prevalence of psychiatric disorders in the United States. They reported 14.3% lifetime prevalence rates for alcohol abuse/dependence and 6.2% lifetime

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<sup>45</sup> Knupfer, G., & Room, R. (1970). Abstainers in a metropolitan community. *Quarterly Journal of Studies on Alcohol*, 31, 108-131.

<sup>46</sup> Cahalan, D., Cisin, I. H., & Crossley, H. M. (1969). *American drinking practices: A national study of drinking behavior and attitudes*. New Brunswick, NJ: Rutgers Center of Alcohol Studies.

<sup>47</sup> Cunningham, J. A. (1999a). Resolving alcohol-related problems with and without treatment: The effects of different problem criteria. *Journal of Studies on Alcohol*, 60, 463-466.

<sup>48</sup> Bagnall, D. (1991). Alcohol and drug use in a Scottish cohort: 10 years on. *British Journal of Addiction*, 86, 895-904. Kandel, D. B., & Raveis, V. H. (1989). Cessation of illicit drug use in young adulthood. *Archives of General Psychiatry*, 46, 109-116.

<sup>49</sup> Cahalan, D. And Room, R. (1974). *Problem Drinking among American Men*. New Brunswick: Rutgers Center of Alcohol Studies. Clark, W.B. & Cahalan, D. (1976). Changes in problem drinking over a four-year span. *Addictive Behaviors*, 1, 251-259.

<sup>50</sup> Robins, L. N., Locke, B. Z., & Regier, D. (1991). An overview of psychiatric disorders in America. In L. N. Robins & D. A. Regier (Eds.), *Psychiatric disorders in America: The Epidemiologic Catchment Area Study* (pp. 328-366). New York: The Free Press.



prevalence rates for drug abuse/dependence. They further reported that, of those individuals who had experienced substance use disorders in their lives, 54% of those with alcohol use disorders had been in remission for the past year and 59% of those with drug use disorders had been in remission for the past year (pp. 343-344).<sup>51</sup> Table 2 extrapolates these rates to obtain a recovery prevalence estimate based on the current U.S. adult population.

**Table 2: Extrapolated Estimates of Remission from Substance Use Disorders for U.S. Adults Based On ECA Study**

Population	Number
Current U.S. Population Age 18 and over	232,458,000 (2009 Census) <sup>52</sup>
Estimated Number in U.S. Experiencing Lifetime Alcohol Use Disorder (14.3% rate)	33,241,494
Estimated Number in U.S. Experiencing Lifetime Drug Use Disorder (8.8% rate)	20,456,304
Estimated Number of U.S. Adults in Remission from Alcohol Use Disorders (54% rate)	17,950,407
Estimated Number of U.S. Adults in Remission/recovery from Drug Use Disorders (59% rate)	12,069,219
Total Estimate of U.S. Adult Population in Remission from Substance Use Disorders	30,019,626 (12.9% of population)

The National Comorbidity Survey: Kessler and colleagues<sup>53</sup> conducted a survey of the prevalence of psychiatric and substance use disorders within the U.S. population aged 15-54 and found that 26.6% of those surveyed met criteria for lifetime substance use disorders (SUD) but only 11.3% met such criteria during the past 12 months. That would suggest an SUD remission rate of 57.5% among the U.S. adolescent and adult population. Extrapolated onto current population figures, this would suggest that 61,833,828 of the 232,458,000 adults aged 18 or higher in the U.S. population have met diagnostic criteria for SUDs in their lives, but that

<sup>51</sup> Robins, L. N., Locke, B. Z., & Regier, D. (1991). An overview of psychiatric disorders in America. In L. N. Robins & D. A. Regier (Eds.), *Psychiatric disorders in America: The Epidemiologic Catchment Area Study* (pp. 328-366). New York: The Free Press.

<sup>52</sup> 2009 Estimate of US adults over age 18: 232,458,000. US Census Figure: 308,700,000 million for 2010. <http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf>

<sup>53</sup> Kessler, R., McGonagle, K., Zhao, S., Nelson, C., Hughes, M., Eshelman, S.,...Kendler, K. (1994). Lifetime and 12-month prevalence of DSM-II-R psychiatric disorders in the United States. *Archives of General Psychiatry*, 51, 8-19.

35,554,451 no longer experience AOD problems serious enough to meet SUD diagnostic criteria.

**Table 3: Substance Use Disorder Remission/Recovery Estimate based on the National Comorbidity Survey**

Population	Number
Current U.S. Population Age 18 and over	232,458,000 (2009 Census)
Estimated Number Within that Population Experiencing Lifetime SUD (26.6% rate)	61,833,828
Estimated Number of U.S. Adults in Remission/recovery from SUDs (57.5% remission rate)	35,554,451 (15.3% of adult population)

In 2005, Kessler and colleagues published a replication of the National Comorbidity Survey. In the replication study, the lifetime prevalence rate for substance use disorders was 14.6%<sup>54</sup> and the rate of substance use disorders for the past 12 months was 3.8%, suggesting that 10.8%<sup>55</sup> of the population once met but no longer meets DSM-IV criteria for substance use disorders. That 10.8% remission rate would lead to a current estimate of 25,105,464 U.S. adults in remission from substance use disorders.

The National Health Interview: In 1988, the National Institute on Alcohol Abuse and Alcoholism sponsored a supplement to the National Health Interview. In this survey, 18.5% of the U.S. adult population self-identified as former drinkers. Of these, 21% met past DSM alcohol dependence criteria, and 42% met past DSM alcohol abuse criteria.<sup>56</sup> If these rates have continued into the present, they would suggest the recovery prevalence figures for alcohol use disorders represented in Table 4.

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<sup>54</sup> Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R. & Walters, E.E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 593-603.

<sup>55</sup> Kessler, R.C., Chiu, W.T., Demier, O. & Walters, E.E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey replication. *Archives of General Psychiatry*, 62, 617-627.

<sup>56</sup> Hasin, D. S., & Grant, B. (1995). AA and other help seeking for alcohol problems: Former drinkers in the U.S. general population. *Journal of Substance Abuse*, 7, 281-292.

**Table 4: Alcohol Use Disorder Recovery Estimate based on National Health Interview**

Population	Number
Current U.S. Population Age 18 and over	232,458,000 (2009 Census)
Estimated Number of Former Drinkers in U.S. Population, based on 1988 Survey Rate	43,004,730
Estimated Number of Former Drinkers with Past Alcohol Use Disorders	27,092,979 (11.6% of adult population)

This estimate of 27,092,979 would not include persons in remission from alcohol use disorder via moderated use of their drinking.

National Longitudinal Alcohol Epidemiologic Survey (NLAES):<sup>57</sup> Dawson<sup>58</sup> conducted a survey of prior-to-past-year alcohol abuse or dependence. In this sample she found a total remission rate of 72.2%—22.3% by abstinence and 49.9% by decelerated drinking that no longer met criteria for abuse or dependence. Hasin and colleagues<sup>59</sup> conducted a survey of 876 adults who self-reported consuming 5 or more drinks at least once in the past year. Two thirds of those meeting diagnostic criteria for alcohol abuse no longer met criteria at one-year follow-up, whereas only one third of those meeting diagnostic criteria for alcohol dependence no longer met criteria at follow-up, with 29% of that group reporting full remission. The major conclusion drawn from this study was that “the course of abuse and dependence differ markedly and significantly” (pp. 132-33).<sup>60</sup>

Hasin and colleagues<sup>61</sup> studied the prevalence of DSM-IV alcohol abuse and dependence in a random sample of 43,093 adults. The 12-month prevalence rate was 4.7% for alcohol abuse and 3.8% for alcohol dependence. The lifetime prevalence rate was 17.8% for alcohol abuse and 12.5% for alcohol dependence. Applying these rates to the total adult population of the United States (232,458,000),<sup>62</sup> we get a remission rate (those meeting lifetime

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<sup>57</sup> Use of the NLAES to estimate recovery/remission prevalence for substance use disorders was first suggested to the author in a personal communication August 3, 2009 from Dr. Mark Wellenbring when he was serving at NIH/NIAAA. His figures are updated here based on the latest census data.

<sup>58</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779.

<sup>59</sup> Hasin, D. S., Van Rossen, R., McCloud, S., & Endicott, J. (1997). Differentiating DSM-IV alcohol dependence and abuse by course: Community heavy drinkers. *Journal of Substance Abuse*, 9, 127-135.

<sup>60</sup> Hasin, D. S., Van Rossen, R., McCloud, S., & Endicott, J. (1997). Differentiating DSM-IV alcohol dependence and abuse by course: Community heavy drinkers. *Journal of Substance Abuse*, 9, 127-135.

<sup>61</sup> Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, correlates, disability and comorbidity of DSM-IV alcohol abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and related conditions. *Archives of General Psychiatry*, 64(7), 830-842.

<sup>62</sup> <http://www.census.gov/compendia/statab/2011/tables/11s0007.pdf>

diagnostic criteria but not past-year criteria) of 72% for alcohol use disorders—73.6% (40,445,666 persons) for alcohol abuse and 69.6% (26,883,662 persons) for alcohol dependence.

**Table 5: Estimated Population in Remission from Alcohol Use Disorders**

<b>Diagnosis</b>	<b>Met Diagnostic Criteria Past 12 Months</b>	<b>Met Lifetime Diagnostic Criteria</b>	<b>Remission Rate</b>	<b>Estimated Number of Americans in Remission</b>
Any Alcohol Use Disorder	8.5% (19,758,930)	30.3% (70,434,774)	71.9%	50,675,844
Alcohol Abuse	4.7% (10,925,526)	17.8% (41,377,524)	73.6%	30,451,998
Alcohol Dependence	3.8% (8,833,404)	12.5% (29,057,250)	69.6%	20,223,846

Compton and colleagues<sup>63</sup> reported similar data for drug use disorders in the National Epidemiologic Survey on Alcohol and Related Conditions. These figures are presented in Table 6.

**Table 6: Estimated Population in Remission from Drug Use Disorders**

<b>Diagnosis</b>	<b>Met Diagnostic Criteria Past 12 Months</b>	<b>Met Lifetime Diagnostic Criteria</b>	<b>Remission Rate</b>	<b>Estimated Number of Americans in Remission</b>
	2% (4,649,160)	10.3% (23,943,174)	80%	19,294,014
Drug Abuse	1.4% (3,254,412)	7.7% (17,899,266)	81.8%	14,644,852
Drug Dependence	.6% (1,394,748)	2.6% 6,043,908	76.9%	4,649,160

National Epidemiologic Survey on Alcohol and Related Conditions (NESARC): Dawson and colleagues<sup>64</sup> presented data on the 2001-2002 National Epidemiologic Survey on Alcohol

<sup>63</sup> Compton, W. M., Thomas, Y. F., Stinson, F. S., & Grant, B. F. (2007). Prevalence, correlates, disability and comorbidity of DSM-IV drug abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and related conditions. *Archives of General Psychiatry*, 64(5), 566-576.

and Related Conditions (NESARC), based on a U.S. general population survey of 43,093 adults that included data on both abstinent and non-abstinent remissions (drinking without symptoms of an alcohol use disorder [AUD]).

Of those who reported prior-to-past-year alcohol dependence, 75% no longer met dependence criteria and 47.7% were in full remission for the past year (18.2% abstainers, 17.7% low-risk drinkers, and 11.8% asymptomatic risk drinkers). Of those in remission, 29.6% reported having been in remission for five years or more.

Dawson and colleagues<sup>65</sup> reported remission rates for alcohol use disorders over a three-year follow-up period in a general population sample. Their results are summarized in Table 7, with remission prevalence projections for the general population based on the rates reported in their study.

**Table 7: Extrapolations of NESARC Data for Projections of National AUD Remission Estimates<sup>66</sup>**

Remission Categories	% of Population in NESARC Sample	Projected Estimate for U.S. Population based on 2009 Census of 232,458,000 Aged 18 or Older
Non-abstinent Remission from Alcohol Abuse (drinking with no AUD symptoms)	3.7%	8,600,946
Abstinent Remission from Alcohol Abuse	0.3%	697,374
Non-abstinent Remission from Alcohol Dependence (drinking with no AUD symptoms)	1%	2,324,580
Abstinent Remission from Alcohol Dependence	0.3%	697,374

<sup>64</sup> Dawson, D. A., Grant, B. F., Stinson, F. S., Chou, P. S., Huang, B., & Ruan, W. J. (2005). Recovery from DSM-IV alcohol dependence: United States, 2001-2002. *Addiction*, 100(3), 281-292. Dawson, D. A., Stinson, F. S., Chou, S. P., & Grant, B. F. (2008). Three-year changes in adult risk drinking behavior in relation to the course of alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 69, 866-77.

<sup>65</sup> Dawson, D. A., Stinson, F. S., Chou, S. P., & Grant, B. F. (2008). Three-year changes in adult risk drinking behavior in relation to the course of alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 69, 866-77.

<sup>66</sup> Dawson, D. A., Stinson, F. S., Chou, S. P., & Grant, B. F. (2008). Three-year changes in adult risk drinking behavior in relation to the course of alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 69, 866-77.

<b>Remission Categories</b>	<b>% of Population in NESARC Sample</b>	<b>Projected Estimate for U.S. Population based on 2009 Census of 232,458,000 Aged 18 or Older</b>
Estimate of U.S. Adults in Non-abstinent Remission from Alcohol Use Disorders	4.7%	10,925,526
Estimate of U.S. Adults in Abstinent Remission from Alcohol Use Disorders	0.6%	1,394,748
Total Estimate of U.S. Adults in Remission from Alcohol Use Disorders over a span of 3 years	5.3%	12,320,274 (over a span of three years)
Partial Remission <sup>67</sup> from Alcohol Dependence over a span of 3 years	2.2%	5,114,076

The Dawson et al.<sup>68</sup> data produce lower estimates than those of other studies that compare rates of lifetime substance use disorders with rates of past-year substance use disorders, because these figures represent remission status over a three-year period.

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<sup>67</sup> “Partial remission” is defined in this study as not meeting dependence diagnostic criteria, but having one or more symptoms of alcohol abuse or dependence.

<sup>68</sup> Dawson, D. A., Stinson, F. S., Chou, S. P., & Grant, B. F. (2008). Three-year changes in adult risk drinking behavior in relation to the course of alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 69, 866-77.

**Table 8: Summary of Remission Rates and Recovery Prevalence Estimates across Studies, 1991-2010**

Study	Remission Rate in Total Population	Remission Rate among Those with Lifetime SUD	Estimated Recovery Prevalence in the U.S. Adult Population Based on 2009 Census of 232,458,000 Aged 18 or Older
Robins, Locke, & Regier, 1991 <sup>69</sup>	12.9%	54% for alcohol use disorder and 59% for drug use disorders	30,019,626 (17,950,407 for alcohol use disorders; 12,069,219 for drug use disorders)
Kessler et al., 1994 <sup>70</sup>	15.3% for all substance use disorders	57.5% for all substance use disorders	35,554,451
Kessler et al., 2005 replication	10.8% for all substance use disorders	74% for all substance use disorders	25,105,464
Hasin & Grant, 1995 <sup>71</sup>	11.6% for persons with an alcohol use disorder	NA	27,092,979 (former drinkers with past alcohol problems)
Dawson, 1996 <sup>72</sup>	7.7% for alcohol dependence	72.2%	17,899,266 (in remission from alcohol dependence)
Hasin et al., 1997 <sup>73</sup>	12.6% for alcohol use disorders	61% for alcohol abuse; 29% for alcohol dependence	29,289,708 (in remission from past alcohol use disorders)

<sup>69</sup> Robins, L. N., Locke, B. Z., & Regier, D. (1991). An overview of psychiatric disorders in America. In L. N. Robins & D. A. Regier (Eds.), *Psychiatric disorders in America: The Epidemiologic Catchment Area Study* (pp. 328-366). New York: The Free Press.

<sup>70</sup> Kessler, R., McGonagle, K., Zhao, S., Nelson, C., Hughes, M., Eshelman, S., Kendler, K. (1994). Lifetime and 12-month prevalence of DSM-II-R psychiatric disorders in the United States. *Archives of General Psychiatry*, 51, 8-19.

<sup>71</sup> Hasin, D. S., & Grant, B. (1995). AA and other help seeking for alcohol problems: Former drinkers in the U.S. general population. *Journal of Substance Abuse*, 7, 281-292.

<sup>72</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779.

<sup>73</sup> Hasin, D. S., Van Rossen, R., McCloud, S., & Endicott, J. (1997). Differentiating DSM-IV alcohol dependence and abuse by course: Community heavy drinkers. *Journal of Substance Abuse*, 9, 127-135.

<b>Study</b>	<b>Remission Rate in Total Population</b>	<b>Remission Rate among Those with Lifetime SUD</b>	<b>Estimated Recovery Prevalence in the U.S. Adult Population Based on 2009 Census of 232,458,000 Aged 18 or Older</b>
Dawson et al., 2005 <sup>74</sup>	10.3% for alcohol dependence	47.7% in full remission from alcohol dependence for past year; 29% in remission 5 or more years	23,943,174 (in remission from alcohol dependence)
Compton et al., 2007 <sup>75</sup>	8.3% for drug use disorders	80%	19,294,014 (in remission from drug use disorders)
Hasin et al., 2007 <sup>76</sup>	19.8% for alcohol use disorders	72%	46,026,684 (in remission from alcohol use disorders only)
Dawson et al., 2008 <sup>77</sup>	5.3% alcohol use disorders over 3 years	44% in full remission	12,320,274 (in remission from alcohol use disorders)
Public Health Management Corporation Community Health Data Base, 2010 <sup>78</sup>	9.45% (average of 11.4% rate for Philadelphia and 7.5% rate for suburban counties)	NA	21,967,281 (in remission from past alcohol or other drug problems)

<sup>74</sup> Dawson, D. A., Grant, B. F., Stinson, F. S., Chou, P. S., Huang, B., & Ruan, W. J. (2005). Recovery from DSM-IV alcohol dependence: United States, 2001-2002. *Addiction*, 100(3), 281-292.

<sup>75</sup> Compton, W. M., Thomas, Y. F., Stinson, F. S., & Grant, B. F. (2007). Prevalence, correlates, disability and comorbidity of DSM-IV drug abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and related conditions. *Archives of General Psychiatry*, 64(5), 566-576.

<sup>76</sup> Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, correlates, disability and comorbidity of DSM-IV alcohol abuse and dependence in the United States: Results from the National Epidemiologic Survey on Alcohol and related conditions. *Archives of General Psychiatry*, 64(7), 830-842.

<sup>77</sup> Dawson, D. A., Stinson, F. S., Chou, S. P., & Grant, B. F. (2008). Three-year changes in adult risk drinking behavior in relation to the course of alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 69, 866-77.

<sup>78</sup> Community Health Data Base, Measures of Interest for the DBHIDS, Philadelphia County: Public Health Management Corporation, 2010, Southeast Pennsylvania Household Health Survey.



Table 8 (above) shows four studies<sup>79</sup> from which the number of people in remission from all alcohol use disorders can be projected (with a mean estimate of 25,847,586), two studies<sup>80</sup> from which remission of alcohol dependence can be projected (with a mean average of 20,921,220), two studies<sup>81</sup> with estimates of remission from drug use disorders (average of 15,681,617), and four studies<sup>82</sup> of remission from all substance use disorders (with an average projected remission estimate in the US of 28,149,206). Based on this, we could conservatively estimate that the number of people in remission from significant alcohol or drug problems in the United States is more than 25 million, with an estimated range of 25-40 million.<sup>83</sup> Most rates of recovery/remission for alcohol and drug use disorders (54-80%) reported in these general population studies suggest that these rates are higher than the rate of adult lifetime tobacco smokers who have quit smoking (51%).<sup>84</sup>

There are, of course, limitations to such estimates rooted in the methodologies used in each of these studies. Studies may inflate the number of people in recovery by assuming that one year in which a subject does not meet diagnostic criteria represents a stability point of recovery, when in fact that subject does not reach stability (the point at which the risk of future lifetime relapse drops below 15%) until after 4-5 years of continuous recovery.<sup>85</sup> Several researchers have determined this set-point for stability to be in the range of five years of continuous recovery and have recommended that remission from addiction, like remission from

<sup>79</sup> Robins, et al, 1991; Hasin, et al, 1995; Hasin, et al, 1997; Dawson, 2008.

<sup>80</sup> Dawson, et al, 1996; Dawson, et al, 2005.

<sup>81</sup> Robins, et al, 1991; Compton, et al, 2007.

<sup>82</sup> Robins, et al, 1991; Kessler, et al, 1994; Kessler, et al, 2005; and Public Health Management Corporation, 2010.

<sup>83</sup> A larger estimate can be obtained by looking at changes in heavy drinking. About one third of the U.S. adult population does not drink alcohol, 6-9% of whom report having previously been heavy drinkers (consuming more than 120 drinks per month) or having had prior alcohol problems. Based on an adult population of 232,458,000 (2009 Census), that would mean that between 46,026,684 and 68,140,026 of the nation's non-drinkers are former heavy drinkers—an unknown portion of whom met criteria for an alcohol use disorder. Hilton, M. (1986). Abstinence in the general population of the U.S.A. *British Journal of Addiction*, 81, 95-112. Goldman, E., & Najman, J. (1984). Lifetime abstainers, current abstainers and imbibers: A methodological note. *British Journal of Addiction*, 79, 309-314.

<sup>84</sup> Centers for Disease Control and Prevention. (2009). Cigarette smoking among adults and trends in smoking cessation—United States, 2008. *MMWR Morbidity and Mortality Weekly Report*, 58(44), 1227-1232.

<sup>85</sup> De Soto, C.B., O'Donnell, W.E., & De Soto, J.L. (1989). Long-term recovery in alcoholics. *Alcoholism: Clinical and Experimental Research*, 13, 693-697. Vaillant, G. E. (1996). A long-term follow-up of male alcohol abuse. *Archives of General Psychiatry*, 53(3), 243-249. Nathan, P., & Skinstad, A. (1987). Outcomes of treatment for alcohol problems: Current methods, problems and results. *Journal of Consulting and Clinical Psychology*, 55, 332-340. Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779. Jin, H., Rourke, S. B., Patterson, T. L., Taylor, M. J., & Grant, I. (1998). Predictors of relapse in long-term abstinent alcoholics. *Journal of Studies on Alcohol*, 59, 640-646. Dennis, M. L., Foss, M. A., & Scott, C. K. (2007). An eight-year perspective on the relationship between the duration of abstinence and other aspects of recovery. *Evaluation Review*, 31(6), 585-612. Schutte, K., Byrne, F., Brennan, P., & Moos, R. (2001). Successful remission of late-life drinking problems: A 10-year follow-up. *Journal of Studies on Alcohol* 62, 322-334.

cancer, be monitored for a minimum of five years following recovery initiation.<sup>86</sup> Extended recovery is associated with longer periods of initial treatment and more sustained involvement in recovery mutual aid groups,<sup>87</sup> but the principle of recovery stability increasing as a function of time in recovery applies to both treatment-assisted and natural recovery.<sup>88</sup> This suggests the inappropriateness of implying stable outcomes in short-term follow-up studies that describe subjects as abstainers or controlled drinkers as if these were fixed and dichotomous states. Prevalence studies that rely on self-report of resolution of past AOD-related problems may over-inflate recovery estimates by including in this population people who resolved AOD problems that did not meet the severity or duration criteria of substance use disorders. Finally, defining recovery as remission meets only one of the three emerging definitional criteria for recovery—abstinence or remission—without reference to progress toward global health and enhanced quality of life.<sup>89</sup>

There are also factors that can contribute to an underestimate of remission rates. For example, the studies reported do not include people in remission from substance use disorders under age 18, and social stigma attached to AOD problems may result in an underreporting of both past problems and current remission status. Studies that report recovery/remission from AOD problems only in terms of the status of abstinence underreport remission rates by excluding cases in which such problems were resolved through a deceleration of the frequency, intensity, and/or high-risk circumstances of AOD use.

One question related to recovery prevalence is that of recovery rates—the percentage of people in the community who develop AOD problems but later achieve stable recovery from these problems. To address this question, 79 studies of the course of alcohol and other drug problems in the community were analyzed to determine an average recovery rate in non-clinical populations. The results are displayed in Figure 1, with a more complete presentation of the data appearing in Appendix A. The average reported remission/recovery rate for these studies was 49.9%. Figure 2 reveals the average rate of remission found in studies published since 2000 (53.9%).

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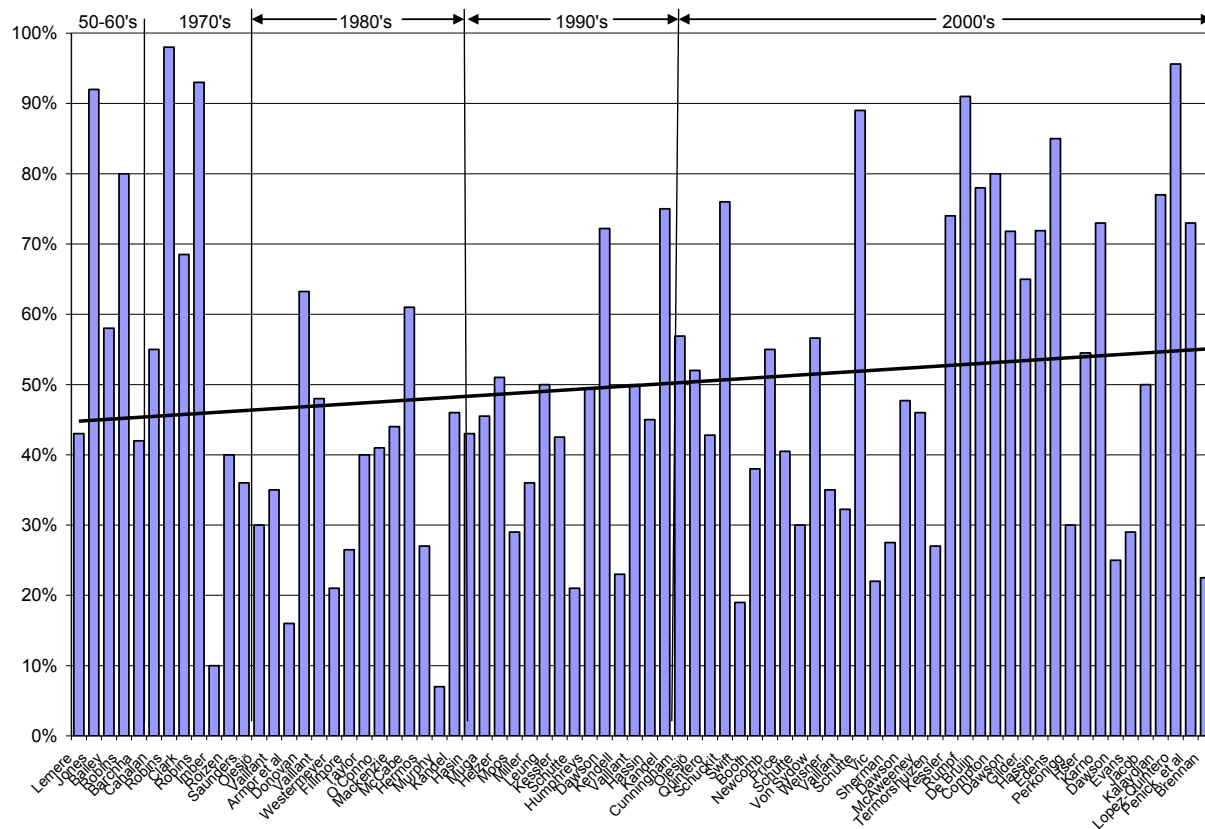
<sup>86</sup> Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051. Hser, Y.-I., Hoffman, V., Grella, C., & Anglin, D. (2001). A 33-year follow-up of narcotics addicts. *Archives of General Psychiatry*, 58, 503-508. Loosen, P. T., Dew, B. W., & Prange, A. J. (1990). Long-range predictors of outcome in abstinent alcoholic men. *American Journal of Psychiatry*, 147, 1662-1666.

<sup>87</sup> Moos, R. H., & Moos, B. S. (2007). Treated and untreated alcohol-use disorders: Course and predictors of remission and relapse. *Evaluation Review*, 31, 564-584.

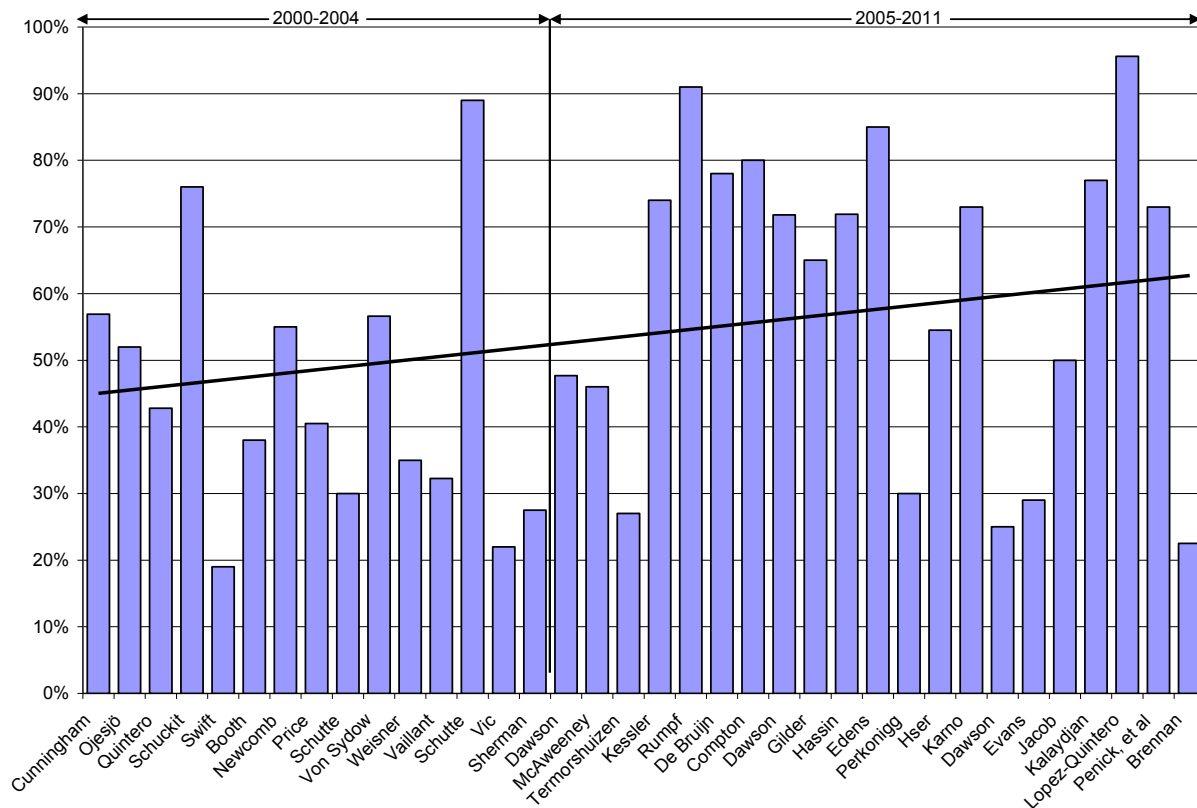
<sup>88</sup> Sobell, L. C., Sobell, M. B., Agrawal, S., Leo, G. I., Johnson-Young, L. Toneatto, T., & Somco, E. R. (2001, November). *A longitudinal prospective study of recovery and relapse among untreated alcohol abusers*. Paper presented at the 35<sup>th</sup> annual meeting of the Association for the Advancement of Behavior Therapy, Philadelphia, PA.

<sup>89</sup> The Betty Ford Institute Consensus Panel (2007). What is recovery? A working definition from the Betty Ford Institute. *Journal of Substance Abuse Treatment*, 33, 221-228; White, W. (2007) Addiction recovery: Its definition and conceptual boundaries. *Journal of Substance Abuse Treatment*, 33, 229-241.

**Figure 1: Community Studies, Remission/Recovery Rates (49.9% average for all studies)**

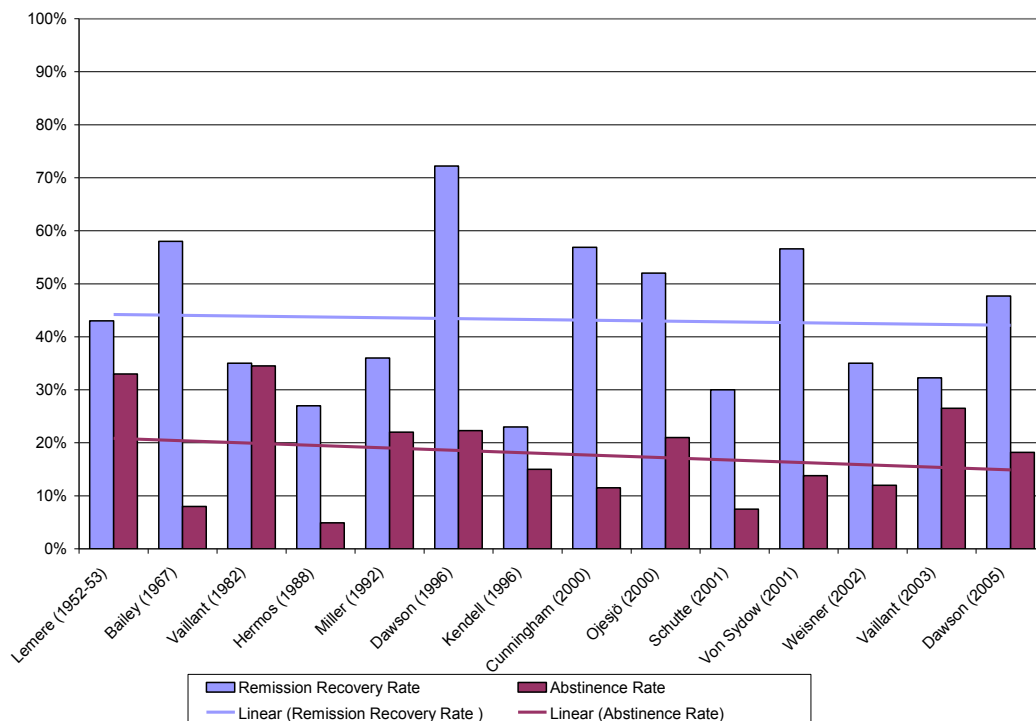


**Figure 2: Community Studies, Remission/Recovery Rates Published Since 2000 (53.9% average remission/recovery rate)**



These studies, as well as the clinical studies we will review shortly, varied in their definitions of recovery (e.g., some defining recovery as remission—no longer meeting diagnostic criteria for a substance use disorder—and some defining recovery in terms of abstinence). Figure 3 illustrates studies that reported both remission and abstinence outcomes. The average remission rate in these studies was 43.5%, of which 17.9% had achieved remission through complete abstinence.

**Figure 3: Community Studies, Remission and Abstinence Rates** (Remission rate average = 43.2%, Abstinence rate average = 17.9%)



These data show that almost 60% of people with substance use disorders in the community resolve these problems through a sustained reduction in the frequency and intensity of AOD use rather than through complete abstinence. Why this strategy is more viable for community populations than for clinical populations will be discussed later in this paper.

## CLINICAL STUDIES

As noted earlier, there is no clear consensus on how recovery from addiction or from the broader arena of alcohol and other drug problems should be defined or, more specific to the present discussion, how the outcomes of addiction treatment should be measured. There has been considerable debate over the question of whether abstinence should constitute the sole or primary outcome of addiction treatment or the principal measure of recovery from substance use disorders.<sup>90</sup> Measures have included the absence or presence of any AOD use; the

<sup>90</sup> Babor, T. F., Longabaugh, R., Zweben, A., Fuller, R. K., Sout, R. L., Anton, R. F., & Randall, C. L. (1994). Issues in the definition and measurement of drinking outcomes in alcoholism treatment research. *Journal of Studies on Alcohol*, Supplement 12, 101-111.

quantity, frequency, and intensity of use as well as the time to onset of resumed use; the consequences of use; the resumption of the disorder as measured by diagnostic criteria; biological markers of use/injury; functional indicators (e.g., arrest, unemployment, homelessness); and cost indicators.<sup>91</sup> There have also been efforts to create classification systems that reflect these outcomes. For example, Miller and colleagues<sup>92</sup> measured outcomes of problem resolution efforts using four categories: 1) abstinent, 2) asymptomatic use, 3) improved but impaired, and 4) unremitted. Booth and colleagues,<sup>93</sup> in their study of untreated at-risk drinkers, noted three drinking trajectories: 1) current and persistent disorder, 2) transitioning from at-risk drinking to an alcohol use disorder, and 3) transitioning from an alcohol disorder to either less problematic drinking or abstinence.

## **CLINICAL STUDIES (ADULT RECOVERY RATES)**

A total of 276 adult studies reporting recovery/remission rates were identified for this analysis. These studies encompass sample sizes ranging from 19 to more than 8,000, follow-up periods ranging from 3 months to 60 years, and extremely diverse clinical populations. Table 9 displays the number of studies identified within each of several time periods and is followed by figures showing rates of remission shown in these studies.

**Table 9: Studies Chosen for Analysis by Period of Publication**

<b>Time Period Study was Published</b>	<b>Number of Studies Included in Analysis</b>
1868-1959	44
1960s	31
1970s	42
1980s	31
1990s	41
2000-2004	43
2005-2011	44

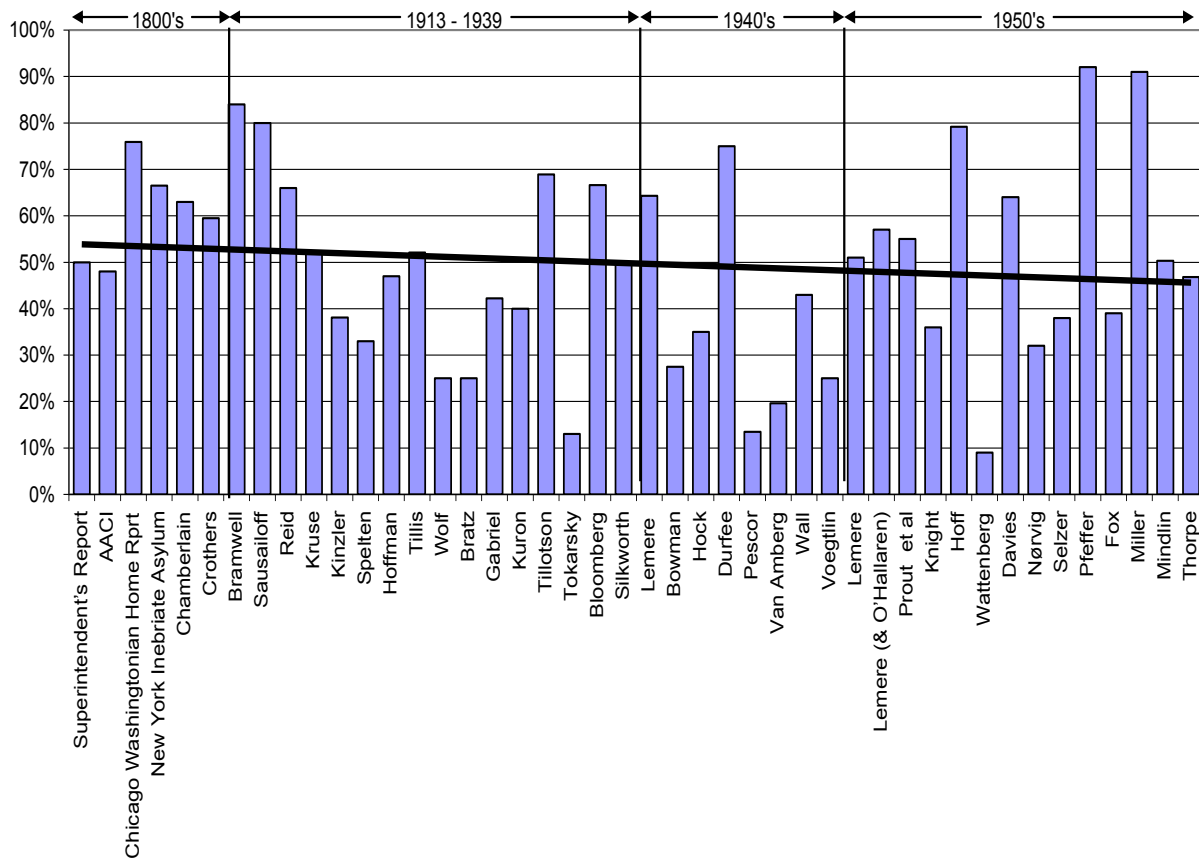
<sup>91</sup> Babor, T. F., Longabaugh, R., Zweben, A., Fuller, R. K., Sout, R. L., Anton, R. F., & Randall, C. L. (1994). Issues in the definition and measurement of drinking outcomes in alcoholism treatment research. *Journal of Studies on Alcohol*, Supplement 12, 101-111.

<sup>92</sup> Miller, W. R., Leckman, A. L., Delaney, H. D., & Tinkcom, M. (1992). Long-term follow-up of behavioral self-control training. *Journal of Studies on Alcohol*, 3, 249-261.

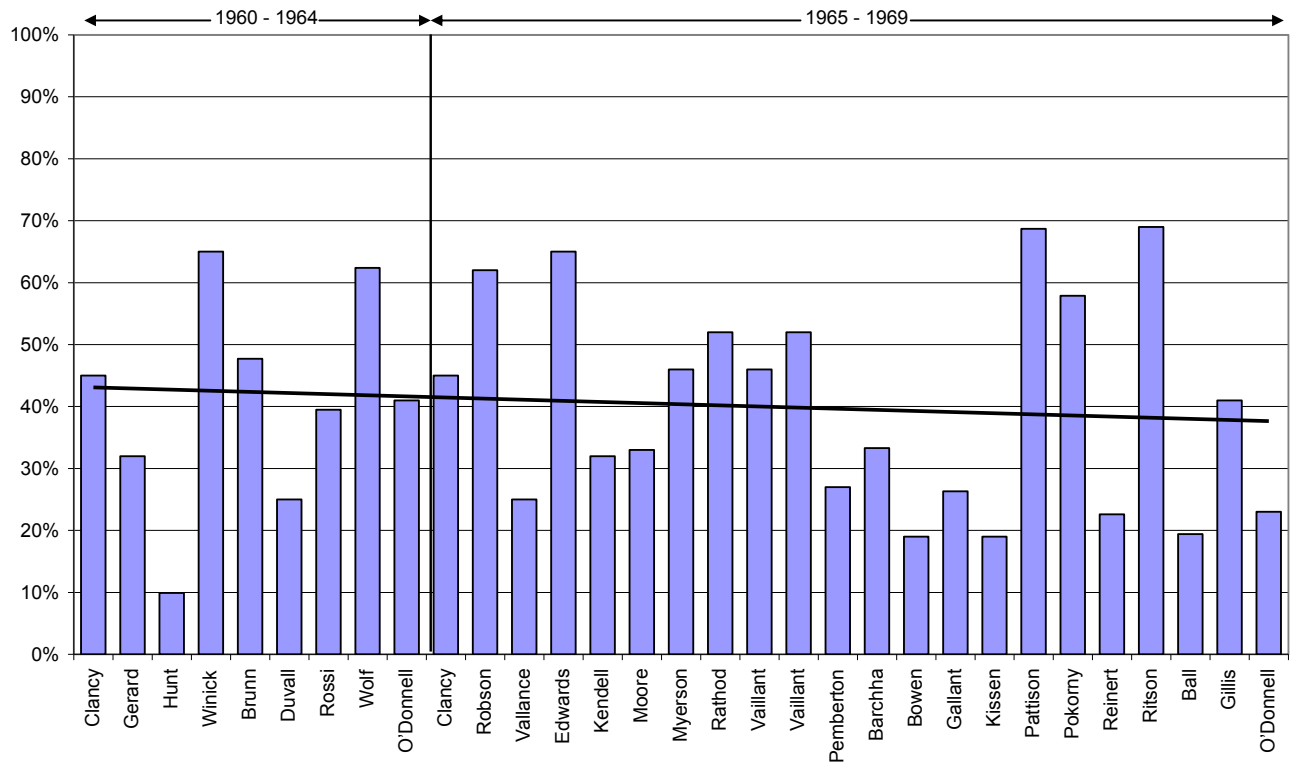
<sup>93</sup> Booth, B. M., Fortney, S. M., Fortney, J. C., Curran, G. M., & Kirchner, J. E. (2001). Short-term course of drinking in an untreated sample of at-risk drinkers. *Journal of Studies on Alcohol*, 62, 580-588.

Figures 4-8 display average reported remission/recovery rates within each of these periods. The average remission/recovery rate for all 276 adult studies was 47.6%. The studies analyzed here were further subdivided into those with sample sizes greater than 300 and those with a follow-up period of five or more years (as proxies for greater methodological rigor). In the 88 studies with sample sizes greater than 300, there was an average recovery/remission rate of 46.4%. In the 74 studies with follow-up periods of five years or greater, there was an average recovery/remission rate of 46.3%. Across all of the studies reviewed that were published since 2000, there was an average reported remission/recovery rate of 50.3%.

**Figure 4: Recovery/Remission Rate at Last Follow-up, Years 1868-1959** (Average recovery rate of 49.8% across 44 studies)

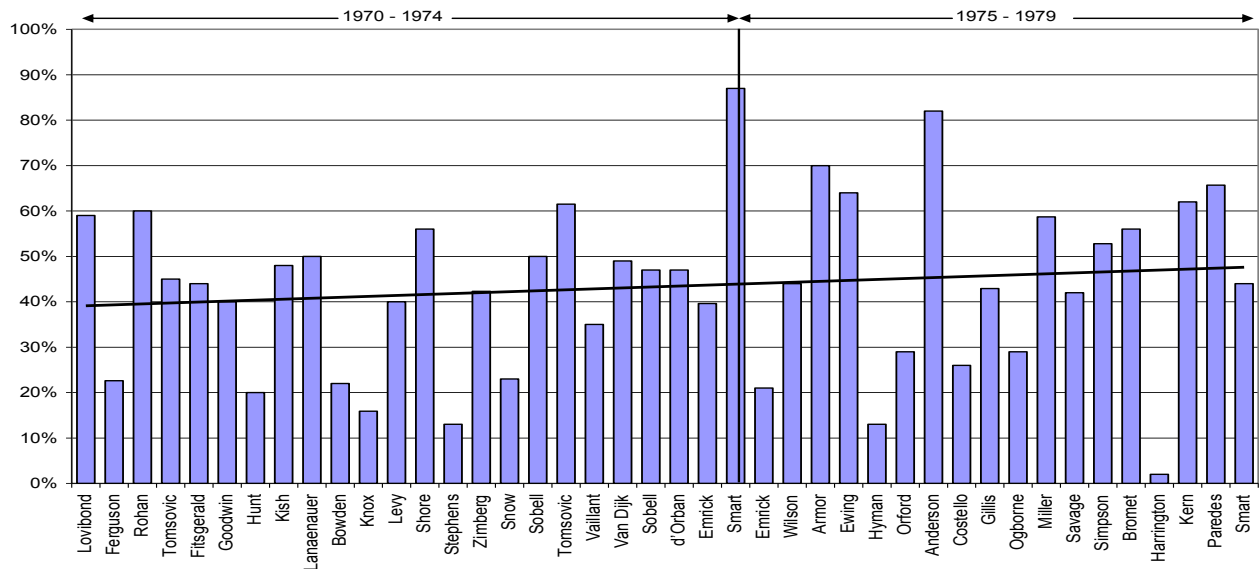


**Figure 5: Recovery/Remission Rate at Last Follow-up in the 1960s** (Average rate of 40.4% across 31 studies)

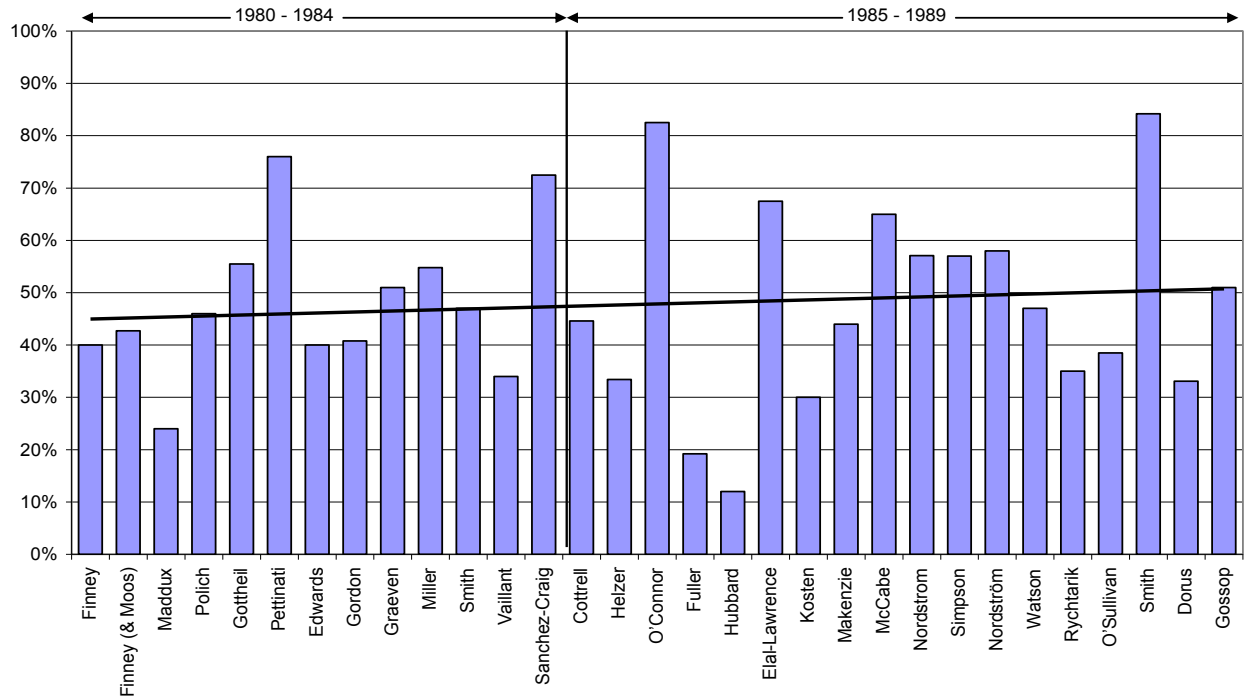




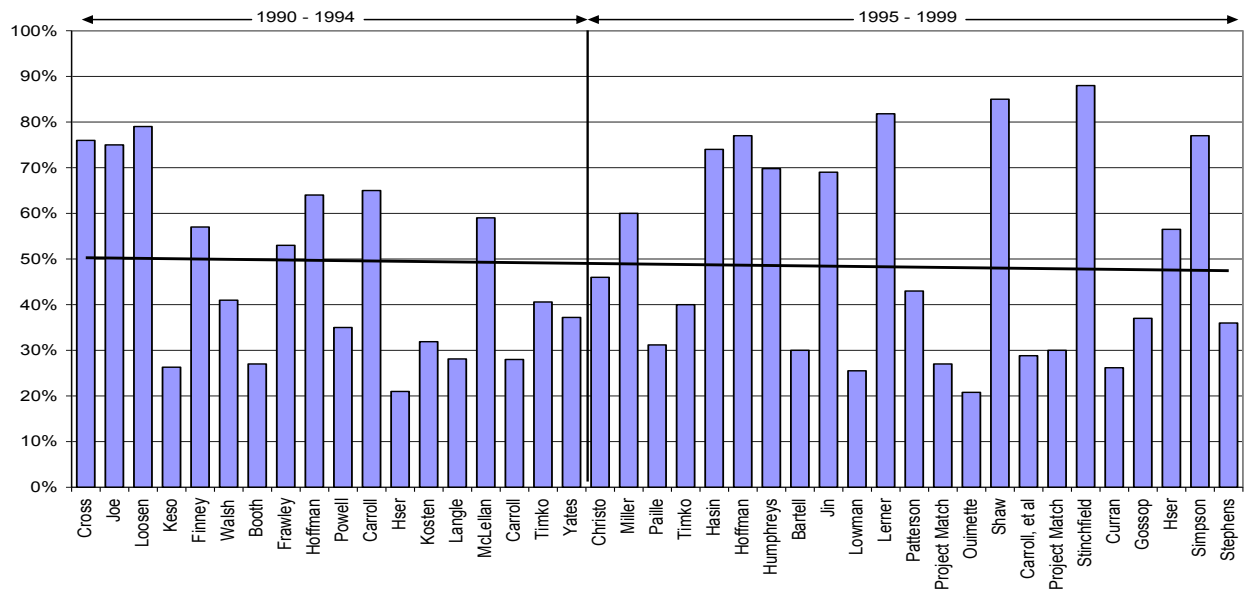
**Figure 6: Recovery/Remission Rate at Last Follow-up in the 1970s** (Average recovery rate of 43.4% across 42 studies)



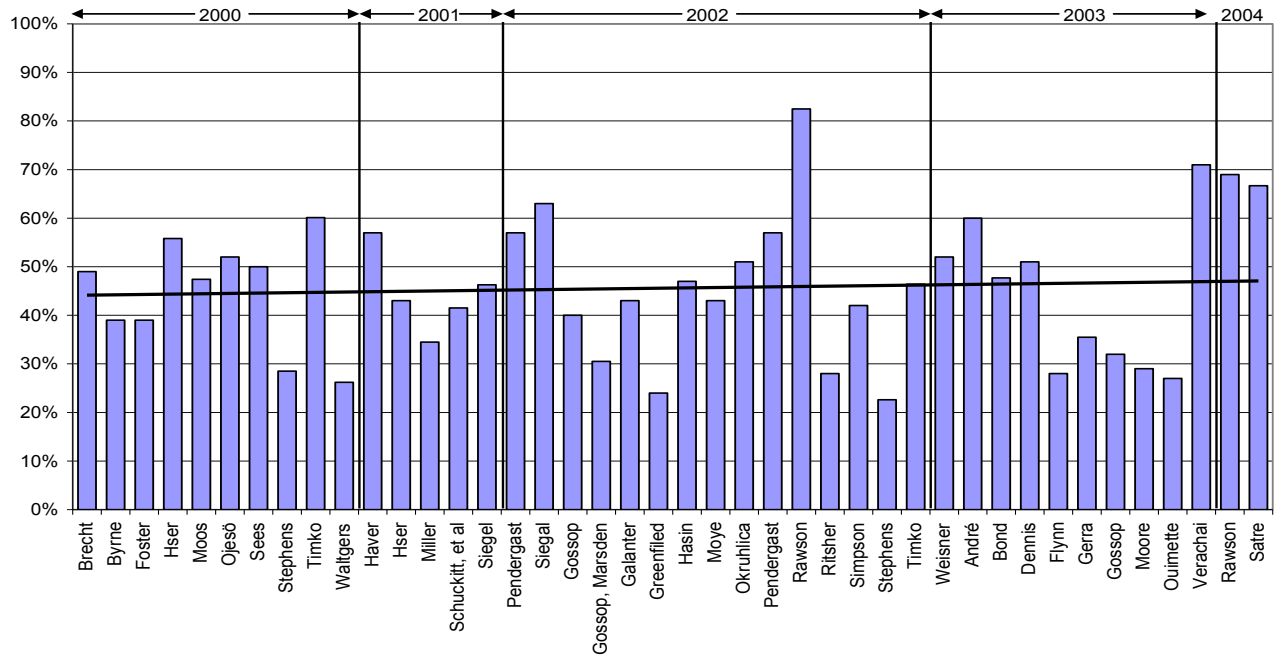
**Figure 7: Recovery/Remission Rate at Last Follow-up in the 1980s** (Average recovery rate of 47.9% across 31 studies)



**Figure 8: Recovery/Remission Rate at Last Follow-up in the 1990s** (Average recovery rate of 48.9% across 41 Studies)



**Figure 9: Recovery/Remission Rate at last Follow-up, 2000-2004** (Average recovery rate of 45.9% across 43 Studies)



**Figure 10: Recovery/Remission Rate at Last Follow-up, 2005-2011 (Average rate of 54.6%)**

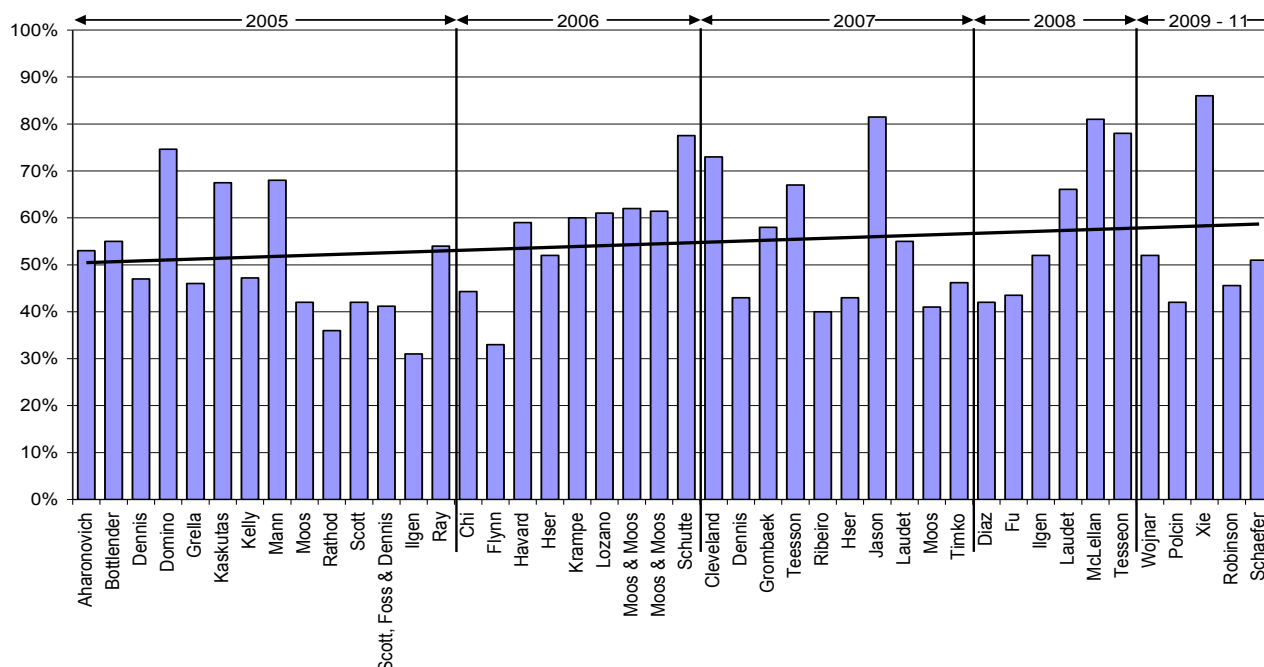


Figure 11 (following page) provides a summary of reported remission/recovery outcomes across six time periods. It becomes clear that the average reported remission rates were lowest in the 1960s (40.4%) and highest in the years 2005-2011 (54.6%).

The average recovery/remission rate for all 276 adult clinical studies (47.6%) is higher than the averages found in earlier reviews, partially due to distinctions between remission and abstinence reports and to inclusion in this analysis of a larger number of studies with shorter follow-up periods. Earlier analyses of treatment outcome studies and their reported remission or abstinence rates include: Bowman & Jellinek,<sup>94</sup> 27.5%; Hunt et al.,<sup>95</sup> 20%; Emrick,<sup>96</sup> 39.6%;

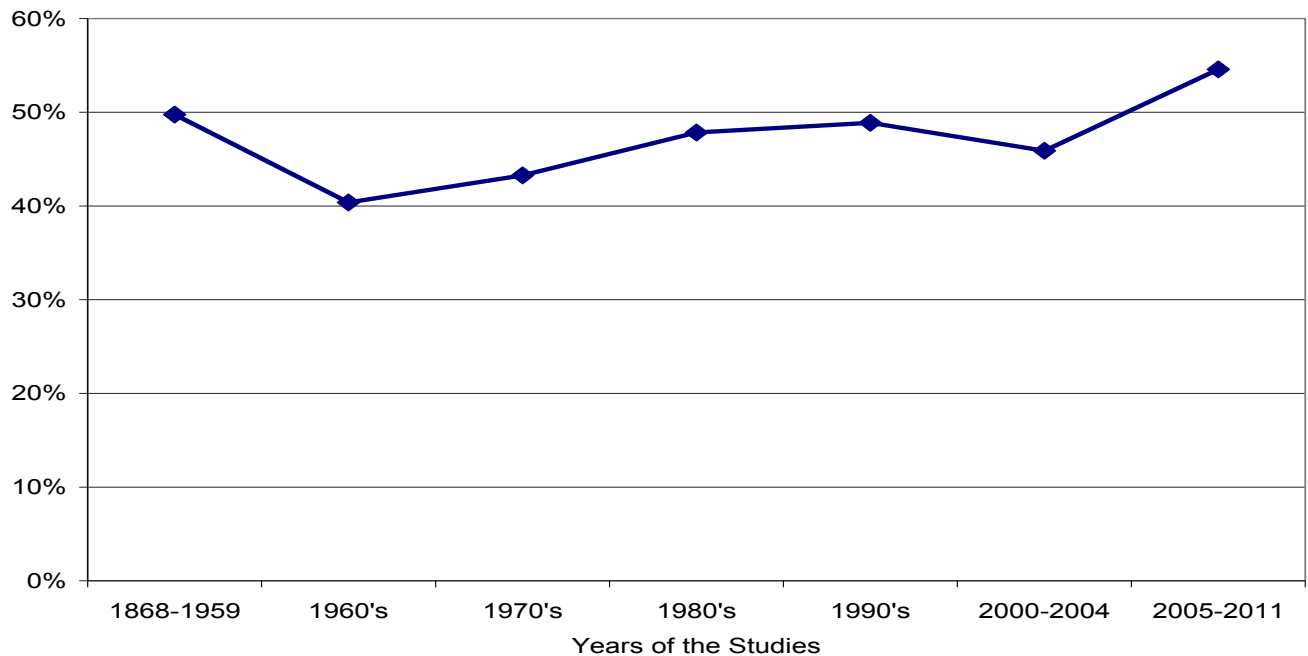
<sup>94</sup> Bowman, K.M. & Jellinek, E.M. (1941). Alcohol addiction and its treatment, *Quarterly Journal of Studies on Alcohol*, 2, 98-176.

<sup>95</sup> Hunt, W. A., Barnett, L. W., & Branch, L. G. (1971). Relapse rates in addiction programs. *Journal of Clinical Psychology*, 27, 455-456.

<sup>96</sup> Emrick, C.D. (1975). A review of psychologically oriented treatment of alcoholism. II. The relative effectiveness of different treatment approaches and the effectiveness of treatment versus no treatment. *J. Stud. Alcohol*, 36, 88.

Costello,<sup>97</sup> 26%; Walters,<sup>98</sup> 26.2%; Miller et al.,<sup>99</sup> 34.5%; Prendergast et al.,<sup>100</sup> 57%; and Monahan & Finney,<sup>101</sup> 43%.

**Figure 11: Reported Remission Rates by Era**



<sup>97</sup> Costello, R. M., Biever, P., & Baillargeon, J. G. (1977). Alcoholism treatment programming: Historical trends and modern approaches. *Alcoholism: Clinical and Experimental Research*, 1, 311-318.

<sup>98</sup> Walters, G. D. (2000). Spontaneous remission from alcohol, tobacco and other drug abuse: Seeking quantitative answers to qualitative questions. *American Journal of Drug and Alcohol Abuse*, 26, 443-460.

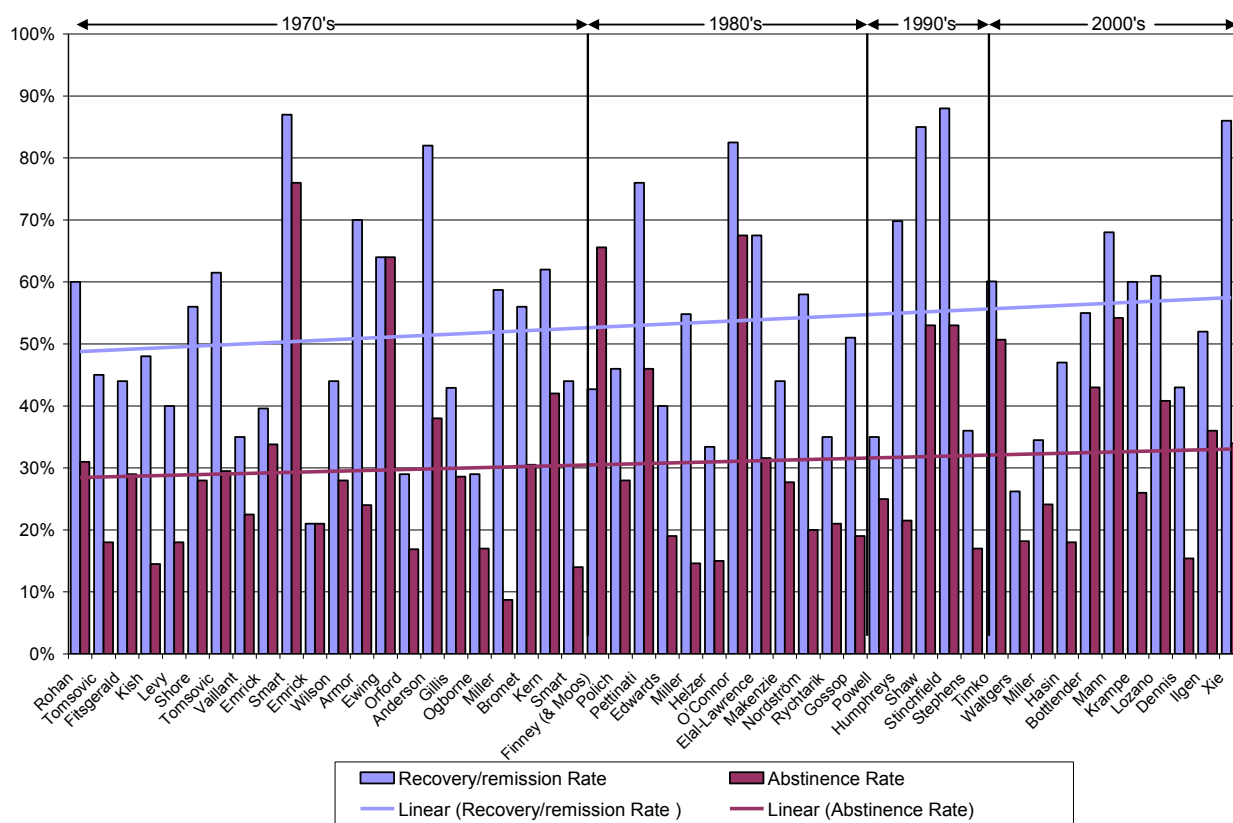
<sup>99</sup> Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *Journal of Studies on Alcohol*, 62(2), 211-220.

<sup>100</sup> Prendergast, M. L., Podus, D., Chang, E., & Urada, D. (2002). The effectiveness of drug abuse treatment: A meta-analysis of comparison group studies. *Drug and Alcohol Dependence*, 67, 53-72.

<sup>101</sup> Monahan, S. C., & Finney, J. W. (1996). Explaining abstinence rates following treatment for alcohol abuse: A quantitative synthesis of patient, research design and treatment effects. *Addiction*, 91, 787-805.

For those concerned that many of the studies reported provided data on remission rates but none on rates of abstinence, 50 published studies were identified since 1970 that reported both remission rates (percentages of persons no longer meeting diagnostic criteria for substance use disorders at follow-up) and abstinence rates (alcohol or drug abstinence for a prescribed period prior to follow-up, or continuous abstinence from initial intervention until final follow-up). Data from those 50 studies are displayed in Figure 12.

**Figure 12: Remission/Recovery Rates at Last Follow-up and Abstinence Rates, 1970s – 2000s** (Average of 53.0% in remission and 30.8% abstinent)



As noted above, the average remission rate for all 276 adult studies was 49.8%. In the 50 studies reporting remission and abstinence rates, the average remission rate was 52.1% and the average abstinence rate was 30.3%. The 21.8% difference between the two reflects the proportion of persons in clinical studies who are reported to be using alcohol and/or other drugs asymptotically or are experiencing problems that do not meet diagnostic criteria for

substance use disorders. This is comparable to the report by Sobell & Sobell<sup>102</sup> that, when people who have resolved alcohol problems are solicited for participation in research studies via newspaper ads or other media outlets, approximately 20% will have resolved their drinking problems via decelerated patterns of use.

Caution should be used in interpreting these rates. Based on the 1992 National Longitudinal Alcohol Epidemiologic Study, Dawson<sup>103</sup> reported that 49.9% of persons in remission from lifetime alcohol dependence had been drinking without symptoms or episodes of intoxication in the past year. However, in a subsequent follow-up, Dawson and colleagues<sup>104</sup> found that 51% of the asymptomatic risk drinkers had re-experienced symptoms of alcohol use disorders (compared to 27.7% of low-risk drinkers and 7.3% of abstainers), underscoring the need for long-term follow-up to calculate rates of sustainable recovery. These studies collectively affirm that deceleration of the frequency and intensity of drinking is a viable strategy for some problem drinkers, but that there is risk in destabilization of this strategy over time.

Remission rates and patterns of resumed use are remarkably similar across multiple drug choices (including nicotine),<sup>105</sup> although remission from opioid addiction appears to be less stable and durable than other patterns of remission.<sup>106</sup> Data from the National Epidemiologic Survey on Alcohol and Related Conditions confirm that the probability of remission varies somewhat by type of drug dependence but rises with years of use across drug choices.<sup>107</sup>

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- <sup>102</sup> Sobell, M. B., & Sobell, L. C. (1991). Recovery from alcohol problems without treatment. In N. Heather, W. R. Miller, & J. Greeley (Eds.), *Self control and the addictive behaviors* (pp. 198-242). New York: Maxwell Macmillan.
- <sup>103</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779.
- <sup>104</sup> Dawson, D. A., Goldstein, R. B., & Grant, B. F. (2007). Rates and correlates of relapse among individuals in remission from DSM-IV alcohol dependence: A 3-year follow-up. *Alcoholism: Clinical and Experimental Research*, 31(12), 2036-2045.
- <sup>105</sup> Hunt, W. A., Barnett, L. W., & Branch, L. G. (1971). Relapse rates in addiction programs. *Journal of Clinical Psychology*, 27, 455-456.
- <sup>106</sup> Calabria, B., Degenhardt, L., Briegleb, C., Vos, T., Hall, W. Lynskey, M.,...McLaren, J. (2010). Systematic review of prospective studies investigating "remission" from amphetamine, cannabis, cocaine or opioid dependence. *Addictive Behaviors*, 35, 741-749. Dennis, M. L., Foss, M. A., & Scott, C. K. (2007). An eight-year perspective on the relationship between the duration of abstinence and other aspects of recovery. *Evaluation Review*, 31(6), 585-612. Hser, Y., Hoffman, V., Grella, C., & Anglin, D. (2001). A 33-year follow-up of narcotics addicts. *Archives of General Psychiatry*, 58, 503-508. Simpson, D. D., Joe, G. W., Lehman, W. E. K., & Sells, S. B. (1986). Addiction careers: Etiology, treatment and 12-year follow-up outcomes. *Journal of Drug Issues*, 16, 107-121. Simpson, D. D., & Marsh, K. L. (1986). Relapse and recovery among opioid addicts 12 years after treatment. In F. M. Tims & C. G. Leukefeld (Eds.), *Relapse and recovery in drug abuse* (NIDA Research Monograph 72, DHHS Publication No. 88-1473, pp. 86-103). Rockville, MD: National Institute on Drug Abuse.
- <sup>107</sup> Lopez-Quintero, C., Hason, D. J., de los Cobas, J. P., Pines, A., Wang, S., Grant, B. F., & Blanco, C. (2010). Probability and predictors of remission from life-time nicotine, alcohol, cannabis or cocaine dependence: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Addiction*, 106(3), 657-669.



**Table 10: Remission Probabilities by Drug Choice and Duration of Use<sup>108</sup>**

Type of Drug Dependence	Remission Probability in Year One	Remission Probability in First Decade	Remission Probability in Lifetime
Nicotine	3%	18.4%	83.7%
Alcohol	3%	37.4%	90.6%
Cannabis	4.7%	66.2%	97.2%
Cocaine	8.6%	75.8%	99.2%

### **CLINICAL STUDIES (ADOLESCENT RECOVERY RATES)**

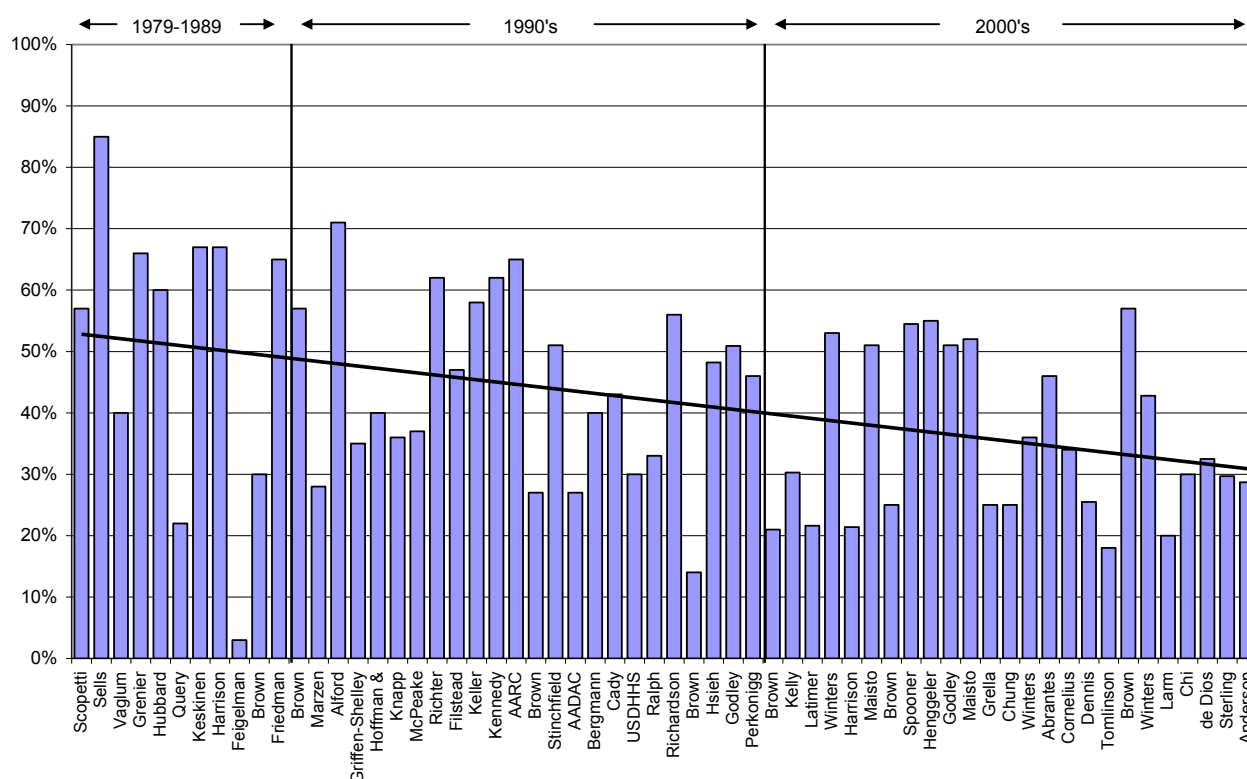
Determining recovery/remission rates for those treated for substance use disorders is more difficult with adolescents than with adults for a variety of reasons, including the fact that adolescent studies are more likely to report outcomes in terms of reduced substance use (and report these in non-quantitative terms, e.g., “improved,” “significant decreases”) rather than in terms of rates of abstinence or percentages of subjects no longer meeting diagnostic criteria for substance use disorders.

A total of 60 follow-up studies were identified that reported recovery outcomes following the specialized treatment of adolescent substance use disorders. Across these 60 studies spanning four decades, the average recovery/remission rate is 42%. The studies analyzed here were further subdivided into those with sample sizes greater than 300 and those with follow-up periods of five or more years (as proxies for greater methodological rigor). There was an average recovery/remission rate of 44% in the 17 studies with samples greater than 300, and an average recovery/remission rate of 42.5% in the 8 studies with follow-up periods of five years or greater. The data from these studies are presented in more detail in Appendix C, which incorporates data from adolescent treatment outcomes studies presented in reviews conducted by Williams and Chang (2000), who, in their review of 53 adolescent substance use treatment outcome studies, found an average 6-month sustained abstinence rate of 38% and an average 12-month abstinence rate of 32%.

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<sup>108</sup> Source: Lopez-Quintero, C., Hason, D. J., de los Cobas, J. P., Pines, A., Wang, S., Grant, B. F., & Blanco, C. (2010). Probability and predictors of remission from life-time nicotine, alcohol, cannabis or cocaine dependence: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Addiction*, 106(3), 657-669.

**Figure 13: Reported Recovery Outcomes in the Treatment of Adolescent Substance Use Disorders**



The 20-percentage-point drop in average reported recovery success for adolescents over the course of the past three decades might be attributed to multiple factors: an actual change in these rates, improved methodological sophistication of outcome studies (calculating rates based on intent-to-treat rather than on “graduates,” validation of self-reports via drug testing, higher rates of follow-up, longer follow-up periods, etc.), greater severity of adolescent AOD problems (e.g., earlier age of onset, greater drug potency, multiple drug use), and changes in case mix (with higher levels of community resources addressing less severe AOD problems more effectively, so that greater proportions of the adolescents who need specialized treatment would be those with greater problem severity/complexity/chronicity).

The studies analyzed here were further subdivided into those with sample sizes greater than 300 and those with follow-up periods of five or more years (as proxies for greater methodological rigor). The 17 studies with sample sizes greater than 300 showed an average

recovery/remission rate of 44%.<sup>109</sup> Those studies that followed adolescents at least 5 years after their treatment episodes averaged a reported 42.5% recovery/remission rate.<sup>110</sup> This might

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- <sup>109</sup> Sells, S. B., & Simpson, D. D. (1979). Evaluation of treatment outcome for youths in drug abuse reporting program (DARP): A follow-up study. In G. M. Beschner & A. S. Friedman (Eds.), *Youth drug abuse: Problems, issues, and treatment* (pp. 571-628). Lexington, MA: DC Heath. Harrison, P. A., & Hoffman, N. G. (1987). *CATOR 1987 report. Adolescent residential treatment: Intake and follow-up findings*. St. Paul, MN: Chemical Abuse/Addiction Treatment Outcome Registry. Friedman, A. S., Schwartz, R., & Utada, A. (1989). Outcome of a unique youth drug abuse program: A follow-up study of clients of the Straight, Inc. *Journal of Substance Abuse Treatment*, 6, 259-268. Hoffman, N. G., & Kaplan, R. A. (1991). *CATOR Report: One-year outcome results for adolescents. Key correlates and benefits of recovery*. St. Paul, MN: CATOR/New Standards. Filstead, W. J. (1992). Treatment outcome: An evaluation of adult and youth treatment services. In J. W. Langerbucher, B. S. McCrady, W. Frankenstein, & P. E. Nathan (Eds.), *Annual review of addictions research and treatment* (Vol 2, p. 249-278). New York: Pergamon Press. AADAC (1995). *Adolescent treatment: Excellence through evaluation*. Calgary: Alberta Alcohol and Drug Abuse Commission, Government of Alberta, Canada. Bergmann, P. E., Smith, M. B., & Hoffman, N. G. (1995). Adolescent treatment: Implications for assessment, practice guidelines, and outcome management. *Pediatric Clinics of North America*, 42, 453-472. Hsieh, S., Hoffman, N. G., & Hollister, D. C. (1998). The relationship between pre-, during-, post-treatment factors, and adolescent substance abuse behaviors. *Addictive Behaviors*, 23, 477-488. Perkonig, A., Lieb, R., Hofler, M., Schuster, P., Sonntag, H., & Wittchen, H. U. (1999). Patterns of cannabis use, abuse and dependence over time: Incidence, progressions and stability in a sample of 1228 adolescents. *Addiction*, 94, 1663-78. Harrison, P. A., & Asche, S. (2001). Adolescent treatment for substance use disorders: Outcomes and outcome predictors. *Journal of Child & Adolescent Substance Abuse*, 11(2), 1-17. Grella, C. E., Hser, Y.-I., Joshi, V., & Rounds-Bryant, J. (2001). Drug treatment outcomes for adolescents with comorbid mental and substance use disorders. *Journal of Nervous and Mental Disease*, 189, 384-392. Chung, T., Martin, C. S., Grella, C. E., Winters, K. C., Abrantes, A. M., & Brown, S. A. (2003). Course of alcohol problems in treated adolescents. *Alcoholism: Clinical and Experimental Research*, 27, 253-261. Dennis, M. L., Godley, S. H., Diamond, G., Tims, F. M., Babor, T., & Donadlson, J.,...Funk, R. (2004). The Cannabis Youth Treatment (CYT) Study: Main findings from two randomized trials. *Journal of Substance Abuse Treatment*, 27, 197-213. Godley, S. H., Dennis, M. L., Godley, M. D., & Funk, R. R. (2004). Thirty-month relapse trajectory cluster groups among adolescents discharged from out-patient treatment. *Addiction*, 99(Suppl. 2), 129-139. Larm, P., Hodgins, S., Larsson, A., Samuelson, Y. M., & Tengstrom, A. (2008). Long-term outcomes of adolescents treated for substance misuse. *Drug and Alcohol Dependence*, 96, 79-89. Chi, F. W., Kaskutas, L. A., Sterling, S., Campbell, C. I., & Weisner, C. (2009). Twelve-step affiliation and 3-year substance use outcomes among adolescents: Social support and religious service attendance as potential mediators. *Addiction*, 104, 927-939. de Diois, M. A., Vaughan, E. L., Stanton, C. A., & Niaura, R. (2009). Adolescent tobacco use and substance abuse treatment outcomes. *Journal of Substance Abuse Treatment*, 37, 17-24.
- <sup>110</sup> Sells, S. B., & Simpson, D. D. (1979). Evaluation of treatment outcome for youths in drug abuse reporting program (DARP): A follow-up study. In G. M. Beschner & A. S. Friedman (Eds.), *Youth drug abuse: Problems, issues, and treatment* (pp. 571-628). Lexington, MA: DC Heath. Vaglum, P., & Fosshim, I. (1980). Differential treatment of young abusers: A quasi-experimental study of therapeutic community in a psychiatric hospital. *Journal of Drug Issues*, 10, 505-516. Marzen, T. J. (1990). The effectiveness of an adolescent rehabilitation program for alcohol and other drug addictions in a San Francisco hospital: A 5 year follow-up study. *Dissertations Abstracts International*, 51, 2979-A. Richardson, D. W. (1996). Drug rehabilitation in a treatment farm setting: The Nitawgi experience, 1978-1990. *Journal of Development & Behavioral Pediatrics*, 17, 258-261. Winters, K. C., Stinchfield, R. D., Opland, E. O., Weller, C., & Latimer, W. W. (2000). The effectiveness of the Minnesota Model approach in the treatment of adolescent drug abusers.

well suggest that reported recovery rates rise in tandem with methodological improvements in the conduct of adolescent treatment follow-up studies—the opposite of what might be expected.

## MEASURING RECOVERY PREVALENCE IN PHILADELPHIA

As part of its goal to evaluate its recovery-focused system-transformation efforts, the Philadelphia Department of Behavioral Health and Intellectual disAbility Services collaborated in adding recovery-focused questions to the bi-annual health survey of Philadelphia and its six surrounding counties conducted by the Public Health Management Corporation. The purpose was to evaluate changes in recovery prevalence and attitudes toward treatment and recovery over time. Three questions related to recovery prevalence were included in the 2010 survey.

Question 1: Did you once have an alcohol or other drug problem that is no longer a problem in your life? 11.4% of Philadelphia respondents answered this question in the affirmative, compared to 7.5% of adults in the suburban counties surrounding Philadelphia.<sup>111</sup>

Question 2: Is there another person in your household or family who once had a significant or major problem with alcohol or other drugs who is now in recovery from that problem? 17.2% of Philadelphia respondents answered this question in the affirmative.<sup>112</sup>

Question 3: Do you personally know someone outside your immediate family who is in recovery from alcohol or other drug problems? 28.8% of Philadelphia respondents answered this question in the affirmative.<sup>113</sup>

These data are being analyzed to obtain a more detailed understanding of the profile of persons and families in recovery within the city of Philadelphia, and of the ways in which recovery status and knowing someone in recovery affects attitudes toward addiction treatment and recovery and the perception of quality of treatment within the city of Philadelphia. The data are also being analyzed by zip code to compare recovery prevalence, recovery support resources, and alcohol and other drug problem indices for each neighborhood in the City. The long-term goal is to establish the capacity to measure changes in annual rates of recovery

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*Addiction*, 94(4), 601-612. Chung, T., Martin, C. S., Grella, C. E., Winters, K. C., Abrantes, A. M., & Brown, S. A. (2003). Course of alcohol problems in treated adolescents. *Alcoholism: Clinical and Experimental Research*, 27, 253-261. Anderson, K. G., Ramo, D. E., Cummins, K. M., & Brown, S. A. (2010). Alcohol and drug involvement after adolescent treatment and functioning during emerging adulthood. *Drug and Alcohol Dependence*, 107, 171-181.

<sup>111</sup> Public Health Management Corporation Community Health Data Base: 2010 Southeast Pennsylvania Household Health Survey.

<sup>112</sup> Public Health Management Corporation Community Health Data Base: 2010 Southeast Pennsylvania Household Health Survey.

<sup>113</sup> Public Health Management Corporation Community Health Data Base: 2010 Southeast Pennsylvania Household Health Survey.

initiation and changes in overall recovery prevalence over time (i.e., the total number of people who have initiated and maintained their recovery status).

## DISCUSSION

**Limitations:** Before we explore the major conclusions that can be drawn from this analysis, it is important to review the limitations of the data presented.

A majority of the studies reported only outcomes related to the course of substance use, without reference to broader arenas of psychosocial functioning. Of necessity, the rates reported here focus specifically on substance use disorder remission or substance use abstinence, rather than on broader dimensions that have come to be understood as essential elements of the recovery process.

The search methodology did not ensure identification of every previous study reporting a recovery outcome, and many modern studies could not be included because they report outcomes in formats (e.g., percentage of days using for complete samples) that could not be converted to either remission or abstinence rates. This report does, however, present the largest number of studies included in an analysis of recovery rates.

The rates were based on widely varying definitions of recovery—from the most common categories of DSM remission-to-abstinence to less uniform categories, e.g., marked improvement, improvement. Even the abstinence rates reported varied in meaning, from continuous abstinence since treatment to abstinence for a set period prior to follow-up, or abstinence at the time of follow-up. Wherever possible, we clarify this influence by reporting outcomes for both remission and abstinence.

A few of the earliest recovery rates reported were based on expert estimates rather than actual studies. Average rates for later studies (those published since 2000) were included to evaluate the potential influence of these early studies on the average recovery rate reported for all studies.

Studies varied widely in their research methodologies, particularly in variations in sample sizes, duration of follow-up, and follow-up rates for the original samples. An effort was made to evaluate this potential bias by reporting recovery rates for studies with sample sizes greater than 300 and studies that followed participants for five or more years.

Particularly problematic were studies that reported outcomes in terms of increases or decreases in drug use (e.g., percentage of days using or abstinent in the past 30 days) within the total sample, without referencing the percentage of the sample that was abstinent, free of AOD-related problems, or no longer meeting DSM criteria for substance use disorders.<sup>114</sup> Also problematic for this analysis were studies that reported outcomes using scales that could not easily be converted to post-treatment remission or abstinence rates. There were many such studies that could not be included in this analysis. It is unclear how these studies might have influenced the reported averages in this report if their data had been reported in terms of precise

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<sup>114</sup> e.g., Zywiak, W. H., Longabaugh, R., & Wirtz, P. (2002). Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcomes. *Journal of Studies on Alcohol*, 63, 114-121.

percentages of samples abstinent or in remission. (Studies listed in the references that do not appear in the figures usually fell into this type of reporting.)

Recap and Discussion of Major Findings: The primary intent of most of the studies reviewed here was to assess the prevalence of AOD problems or to compare one treatment approach to another. Only recently has the field witnessed studies that focused specifically on recovery prevalence and/or recovery status separate and distinct from the issue of treatment evaluation. The large number of studies cited here should not divert attention from the fact that recovery-focused research has yet to come of age as a legitimate branch of addiction studies.

We set out at the beginning of this paper to answer five questions related to recovery prevalence and recovery rates. To answer those questions, we reviewed 415 scientific studies of recovery outcomes (79 community studies, 276 adult clinical studies, and 60 adolescent clinical studies) conducted with clinically and culturally diverse populations in multiple countries over the past century. In summary, this is what we discovered.

*1. How many persons are in recovery from AOD problems in the United States?*

This question was answered by extrapolating national estimates from the major governmental surveys of the course of alcohol and other drug use and related problems (including the Epidemiologic Catchment Area Study, the National Comorbidity Survey, the National Health Interview, the National Longitudinal Alcohol Epidemiologic Survey, and the National Epidemiologic Survey on Alcohol and Related Conditions) and from a 2010 recovery survey conducted by the Public Health Management Corporation in Philadelphia, Pennsylvania and six surrounding counties. Based on this analysis, the percentage of adults in the general population in the United States in remission from substance use disorders ranges from 5.3% to 15.3%. These rates produce a conservative estimate of the number of adults in remission from significant alcohol or drug problems in the United States at more than 25 million people, with a potential range from 25-40 million (not including those in remission from nicotine dependence alone).

*2. What percentage of people who develop AOD problems eventually achieve recovery?*

Of adults surveyed in the general population who once met lifetime criteria for a substance use disorder, an average of 49.9% no longer meet those criteria (53.9% in studies conducted since 2000). In community studies reporting both remission rates and abstinence rates for substance use disorders, an average of 43.5% with such disorders in their lifetime achieved remission, but only 17.9% did so through a strategy of complete abstinence. The high prevalence of non-abstinent remissions in community populations is related to the less severe, less complex, and less prolonged AOD problems experienced in community populations compared to those problems found among people entering addiction treatment in the United States.

3. *What is the rate of recovery for persons whose problems are severe enough to warrant specialized professional treatment?*

In an analysis of 276 addiction treatment follow-up studies of adult clinical samples, the average remission/recovery rate across all studies was 47.6% (50.3% in studies published since 2000). The average remission/recovery rates within those studies with sample sizes of 300 or more and studies with a follow-up period of five or more years—two factors used as a proxy for more methodologically sophisticated studies—were 46.4% and 46.3%, respectively.

In the 50 adult clinical studies reporting remission and abstinence rates, the average remission rate was 52.1% and the average abstinence rate was 30.3%. The 21.8% difference reflects the proportion of persons in post-treatment follow-up studies who, based on available information, are using alcohol and/or other drugs asymptotically or are experiencing only subclinical problems (not severe enough to meet diagnostic criteria for substance use disorders). It is unclear to what extent such patterns of reduced use constitute a permanent state, a state of respite prior to re-addiction, or a transition phase that precedes and increases the chances of later abstinence (as has been found with similar patterns that precede smoking cessation).<sup>115</sup>

The rate of remission achieved through sustained deceleration of AOD consumption rather than abstinence declines as problem severity and length of follow-up increase,<sup>116</sup> although some cases of moderated remission are found even among high-severity populations monitored over the course of years.<sup>117</sup>

Miller and Joyce<sup>118</sup> found that 88.8% of patients rated either abstinent or controlled maintained that status at one year, and Miller<sup>119</sup> found that 91% of patients who had achieved

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<sup>115</sup> Institute of Medicine (2007). *Ending the tobacco problem: A Blueprint for the nation*. Washington, D.C.: The National Academies Press, p. 94.; also see Evans, N., Gilpin, E., Pierce, J., Burns, D., Borland, M. & Bal, D. (1992). Occasional smoking among adults: Evidence from the California Tobacco Survey. *Tobacco Control*, 1, 169-175.

<sup>116</sup> Moos & Finney 1981 Moos, R. H., & Moos, B. S. (2006a). Rates and predictors of relapse after natural and treated remission from alcohol use disorders. *Addiction*, 101, 212-222. Pattison, E. M., Headley, E. B., Gleser, G. C., & Gottschalk, L. A. (1968). Abstinence and normal drinking: An assessment of change in drinking patterns to alcoholics after treatment. *Quarterly Journal of Studies on Alcohol*, 29, 610-633. Smart, R. (1978). Characteristics of alcoholics who drink socially after treatment. *Alcoholism: Clinical and Experimental Research*, 2, 49-52. Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051.

<sup>117</sup> Armor, D. J., & Meshkoff, J. E. (1983). Remission among treated and untreated alcoholics. In N. K. Mello (Ed.), *Advances in substance abuse: Behavioral and biological research: Volume 3* (pp. 239-269). Greenwich, CT: JAI Press. Cunningham, J. (1999). Untreated remission from drug use: The predominant pathway. *Addictive Behaviors*, 24(2), 267-270. Edwards, G. (1985). A later follow-up of a classic case series: D.L. Davies 1962 report and its significance for the present. *Journal of Studies on Alcohol*, 46, 181-190. Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051.

<sup>118</sup> Miller, W. R., & Joyce, M. A. (1979). Prediction of abstinence, controlled drinking, and heavy drinking outcomes following behavioral self-control training. *Journal of Consulting and Clinical Psychology*, 47, 773-775.

<sup>119</sup> Miller, W. R. (1978). Behavioral treatment of problem drinkers: A comparative outcome study of three controlled drinking therapies. *Journal of Consulting and Clinical Psychology*, 46, 74-86.

controlled drinking at 3 months maintained that status at one-year follow-up, but others have documented deterioration in the stability of controlled drinking beyond the one-year point. Self- or collateral report of controlled drinking in early follow-up is not a predictor of controlled drinking at long-term follow-up, but early abstinence is a predictor of better long-term outcomes (both abstinence and asymptomatic drinking).<sup>120</sup> The probability of achieving sustained asymptomatic use following periods of problematic use declines as problem severity and duration increase.<sup>121</sup> Early post-treatment moderate drinkers have a higher relapse rate than those who begin drinking moderately after a sustained period of abstinence.<sup>122</sup>

Early abstinence following treatment indicates increased likelihood of future positive prognosis (either by abstinence or asymptomatic drinking), but early moderation does not predict either moderation or abstinence at later follow-up.<sup>123</sup> Maisto and colleagues<sup>124</sup> found that moderated drinking at year 1 following treatment did not predict successful moderate drinking at year 3. In Vaillant's long-term follow-up study,<sup>125</sup> only 36% of men initially identifying as controlled drinkers were able to sustain that control over all of the follow-up periods. Cycling between controlled drinking and problematic drinking was common in the long-term Vaillant study; fluctuation rather than steady progression may be the most prevalent pattern in community populations. In Vaillant's<sup>126</sup> 60-year follow-up of alcoholic men, only 4 of the 21 men drinking in a controlled manner at age 50 were able to sustain controlled drinking at follow-up at age 70. Vaillant<sup>127</sup> concluded that abstinence is more stable over time than controlled drinking and argued that "return to controlled drinking, as reported in short-term studies, is often a mirage" (p. 1050). The studies of other researchers confirm that conclusion.<sup>128</sup>

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- <sup>120</sup> Miller, W. R., Leckman, A. L., Delaney, H. D., & Tinkcom, M. (1992). Long-term follow-up of behavioral self-control training. *Journal of Studies on Alcohol*, 3, 249-261. Rychtarik, R. G., Foy, D. W., Scotyt, T., Lokey, L., & Prue, D. M. (1987). Five-six-year follow-up of broad spectrum behavioral treatment for alcoholism: Effects of training controlled drinking skills. *Journal of Consulting and Clinical Psychology*, 55, 106-108.
- <sup>121</sup> Miller, W. R., Leckman, A. L., Delaney, H. D., & Tinkcom, M. (1992). Long-term follow-up of behavioral self-control training. *Journal of Studies on Alcohol*, 3, 249-261.
- <sup>122</sup> Finney, J. W., & Moos, R. (1981). Characteristics and prognosis of alcoholics who become moderate drinkers and abstainers after treatment. *Journal of Studies on Alcohol*, 42, 94-105.
- <sup>123</sup> Rychtarik, R. G., Foy, D. W., Scotyt, T., Lokey, L., & Prue, D. M. (1987). Five-six-year follow-up of broad spectrum behavioral treatment for alcoholism: Effects of training controlled drinking skills. *Journal of Consulting and Clinical Psychology*, 55, 106-108.
- <sup>124</sup> Maisto, S. A., Clifford, P. R., Stout, R. L., & Davis, C. M. (2006). Drinking in the year after treatment as a predictor of three-year drinking outcomes. *Journal of Studies on Alcohol*, 67, 823-832.
- <sup>125</sup> Vaillant, G. E. (1996). A long-term follow-up of male alcohol abuse. *Archives of General Psychiatry*, 53, 243-249.
- <sup>126</sup> Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051.
- <sup>127</sup> Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051.
- <sup>128</sup> Finney, J. W., & Moos, R. (1981). Characteristics and prognosis of alcoholics who become moderate drinkers and abstainers after treatment. *Journal of Studies on Alcohol*, 42, 94-105. Pettinati, H. M., Sugarman, A. A., DiDonata, N., & Maurer, H. S. (1982). The natural history of alcoholism over four years after treatment. *Journal of Studies on Alcohol*, 43, 201-205. Xie, H., Drake, R. E., McHugo, G. J., Xie, L., & Mohandas, A. (2010). The 1-year course of remission, abstinence and recovery in dual diagnosis. *Journal of Substance Abuse Treatment*, 39, 132-140.



The prognosis for remission via decelerated drinking rises when people are younger, have lower levels of problem severity and chronicity, and have fewer overall problems.<sup>129</sup> Hasin, Liu, and Paykin<sup>130</sup> did a one-year follow-up on persons with untreated DSM-IV alcohol dependence. While drinking reductions were common in the group as a whole, no subject with 6 or 7 dependence symptoms at baseline had sustained a pattern of drinking reduction, whereas 56.5% of those who had only three symptoms had sustained such reductions for a one-year period. Style of remission also differs by duration of remission. Of those in remission more than 5 years, the percentage in abstinence-based remission rises in tandem with length of remission.<sup>131</sup>

The overall outcomes of the clinical studies reported here must be viewed in light of Moyer and Finney's<sup>132</sup> finding (across 29 studies) that persons in no-treatment conditions (wait list, sought but did not receive treatment, placebo) showed an average abstinence rate of 21% at follow-up. Comparison of our average reported abstinence rate (30.3%) with the 21% abstinence rate at follow-up for those in a no-treatment condition reveals an added effect for those who have received addiction treatment.

Treatment does play an important role in remission from more severe drug problems. Cunningham<sup>133</sup> found that, among adults living in the community who had experienced remission from drug dependence, the percentage with past treatment ranged from 43.1% for cannabis dependence to 90.7% for heroin dependence (with remission from other drug dependencies falling within this range). In community surveys of remission from alcohol problems over the life course, most (including 77% in two Canadian surveys) do so without formal treatment, but those who have received treatment report having had much more severe alcohol problems.<sup>134</sup>

Miller, Walters, and Bennett<sup>135</sup> reviewed 7 of the largest multi-site trials of alcoholism treatment in the US and concluded:

...we believe the data justify, as a conservative estimate, the "rule of thirds": that a year after a single treatment event, one third, on average, remain in full remission and at least another third evidence substantial improvement.<sup>136</sup>

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<sup>129</sup> Miller, W. R. (1983). Controlled drinking: A history and critical review. *Journal of Studies on Alcohol*, 44, 68-83.

<sup>130</sup> Hasin, D., Liu, X., & Paykin, A. (2001). DSM-IV alcohol dependence and sustained reduction in drinking: Investigation in a community sample. *Journal of Studies on Alcohol*, 62, 509-517.

<sup>131</sup> Dawson, D. A. (1996). Correlates of past-year status among treated and untreated persons with former alcohol dependence: United States, 1992. *Alcoholism: Clinical and Experimental Research*, 20(4), 771-779.

<sup>132</sup> Moyer, A., & Finney, J. W. (2002). Outcomes for untreated individuals involved in randomized trials of alcohol treatment. *Journal of Substance Abuse Treatment*, 23(2), 247-252.

<sup>133</sup> Cunningham, J. A. (2000). Remissions from drug dependence: Is treatment a prerequisite? *Drug and Alcohol Dependence*, 59, 211-213.

<sup>134</sup> Sobell, L. C., Cunningham, J. A., & Sobell, M. B. (1996). Recovery from alcohol problems with and without treatment: Prevalence in two population surveys. *American Journal of Public Health*, 86(7), 966-972.

<sup>135</sup> Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *Journal of Studies on Alcohol*, 62(2), 211-220.

The data presented in this paper suggest an even more optimistic view of remission/recovery prognosis and the role professional treatment can play in the resolution of severe AOD problems. This optimism is particularly appropriate when those in need of treatment are able to get an adequate dose of treatment. Among treated individuals, recovery prognosis is related to treatment dose, with those in remission averaging a longer duration of treatment than those still addicted.<sup>137</sup> The under-dosing of addiction treatment may be viewed as analogous to sub-therapeutic doses of antibiotics that may produce temporary symptom suppression but not lasting recovery.

4. *Does the rate of recovery for adolescents following treatment differ from that of adults who seek specialized addiction treatment?*

This analysis compares 276 adult addiction treatment outcome studies conducted between 1868 and 2011 with 60 adolescent addiction treatment outcome studies conducted between 1979 and 2011. The average recovery/remission rate following specialty treatment reported in the adolescent studies was 42% (35% average for those studies conducted since 2000) compared to an average recovery/remission rate of 47.6% reported in the adult studies (50.3% average for those studies conducted since 2000). The 42% average reported for adolescents is comparable to similar reviews, e.g., Sussman's finding of 30-40% post-treatment abstinence rates for adolescents across multiple studies and points of time.<sup>138</sup> Of the 60 adolescent studies examined, the average rates in the two more methodologically rigorous studies (those with sample sizes of 300 or greater and those with follow-up periods of 5 years or longer, as crude proxies for enhanced rigor) are 44% and 42.5%, respectively. Interpretation of these findings should be tempered by the greater number of adult studies and the greater sample sizes and much longer follow-up periods in the adult studies. While the high percentage of adolescents who report some AOD use in the months following treatment is discouraging, studies of longer trajectories of AOD use confirm post-treatment increases in abstinence, reductions in use, and gains in global health of treated adolescents. There is cause for optimism regarding long-term prospects for recovery from substance use disorders. Adolescent recovery rates rise in tandem with treatment completion and participation in continuing care activities—two potential target areas for increasing the quality and effectiveness of adolescent treatment.<sup>139</sup>

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<sup>136</sup> Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *Journal of Studies on Alcohol*, 62(2), 211-220.

<sup>137</sup> Flynn, P. M., Joe, G. W., Broome, K. M., Simpson, D. D., & Brown, B. S. (2003). Recovery from opioid addiction in DATOS. *Journal of Substance Abuse Treatment*, 25(3), 177-186.

<sup>138</sup> Sussman, S. (2010). A review of Alcoholics Anonymous/Narcotics Anonymous for Teens. *Evaluation & the Health Professions*, 33(1), 26-55.

<sup>139</sup> Williams, R. J., & Chang, S. Y. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science and Practice*, 7(2), 138-166. Winters, K. C., Stinchfield, R., Latimer, W. W., & Lee, S. (2007). Long-term outcome of substance-dependent youth following 12-step treatment. *Journal of Substance Abuse Treatment*, 33, 61-69.

5. *How can local communities establish baseline recovery prevalence data that can be used to guide and evaluate recovery-focused systems-transformation efforts?*

Local communities can integrate recovery prevalence questions into regular community health surveys to track changes in recovery prevalence over time as a means of evaluating community-wide strategies for addressing AOD problems. A model for potential replication is the integration of recovery prevalence questions into the bi-annual community health survey conducted in the city of Philadelphia and surrounding counties by the Philadelphia Department of Behavioral Health and Intellectual disAbility Services and the Public Health Management Corporation. Such baseline data are being used there, and could be used in other communities in similar ways, to guide recovery-focused systems-transformation efforts and to evaluate planned interventions in particular geographical areas, e.g., evaluating service needs by zip codes/planning areas and matching treatment/recovery support resources to those areas of greatest problem severity and lowest levels of recovery capital.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Instability in the Course of AOD Problems and Their Resolution:**

Short-term studies of addiction can mask the complex course of this disorder by conveying prognoses that are overly optimistic (e.g., the assumption that short periods of abstinence or remission are naturally sustainable) or overly pessimistic (e.g., the assumption that persons resuming AOD use following treatment will all revert to symptomatic use and further escalation of problem severity). Periods of abstinence as long as 3 months are among the prevailing features of addiction careers and should not be interpreted as sustainable recovery or as evidence that professional help or peer support is not indicated.<sup>140</sup> In Vaillant's<sup>141</sup> long-term follow-up of Harvard undergraduates and inner-city adolescents, 41% of those with two years of abstinence relapsed; 5-6 years predicted the stability point of long-term abstinence. Only 9% of Vaillant's sample with 5 years of abstinence subsequently returned to drinking, and none did after 6 years of abstinence. Short periods of symptomatic use, asymptomatic use, and abstinence are all part of the natural course of addiction. Distinguishing recovery initiation from respites within an addiction career is possible only within a longer time perspective.<sup>142</sup> There is considerable turnover and transitioning back and forth between problem and non-problem AOD use.<sup>143</sup>

<sup>140</sup> Schuckit, M. A., Tipp, J. E., & Bucholz, K. K. (1997). Periods of abstinence following onset of drug dependence in 1,853 men and women. *Journal of Studies on Alcohol*, 58, 581-589.

<sup>141</sup> Vaillant, G. E. (1996). A long-term follow-up of male alcohol abuse. *Archives of General Psychiatry*, 53, 243-249.

<sup>142</sup> Gottheil, E., Thornton, C. C., Skoloda, T. E., & Alterman, A. I. (1982). Follow-up of abstinent and nonabstinent alcoholics. *American Journal of Psychiatry*, 139, 560-565. Vaillant, G. E. (1983). *The natural history of alcoholism: Causes, patterns, and paths to recovery*. Cambridge, MA: Harvard University Press.

<sup>143</sup> Clark, W. B. (1976). Loss of control, heavy drinking and drinking problems in a longitudinal study. *Journal of Studies on Alcohol*, 37(9), 1256-1290.

Addiction and recovery both are best viewed as fluid rather than fixed states, but buried within this fluidity is a natural momentum toward remission and recovery. Even the most chronic, intractable patterns of addiction contain opportunities for full recovery,<sup>144</sup> and buried within even the most seemingly solid recoveries lie vulnerabilities for reactivation of active addiction.<sup>145</sup> This fluidity underscores the need for sustained and assertive recovery management.

For most people, AOD problems are neither persistent nor progressive.<sup>146</sup> Even when prolonged alcohol- and drug-related problems seem to be escalating to the point of no return, forces are accumulating that increase the probability of recovery.<sup>147</sup> This remission/recovery momentum exists in both the presence and the absence of professional treatment.<sup>148</sup>

### Windows of Opportunity for Early Re-intervention:

Of those who resume AOD use following treatment, most do so in the first days or weeks—with 60-80% of those returning to use doing so in the first 90 days after treatment.<sup>149</sup> In one major treatment follow-up study,<sup>150</sup> 34% of those treated returned to AOD use within 3 days

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- <sup>144</sup> Vaillant, G. E., Clark, W., Cyrus, C., Milofsky, E. S., Kop, J., Wulsin, V. W., & Mogielnicki, N. P. (1983). Prospective study of alcoholism treatment: Eight-year follow-up. *American Journal of Medicine*, 75, 455-463.
- <sup>145</sup> White, W., & Schulstad, M. (2009). Relapse following prolonged addiction recovery: Time for answers to critical questions. *Counselor*, 10(4), 36-39.
- <sup>146</sup> Booth, B. M., Fortney, S. M., Fortney, J. C., Curran, G. M., & Kirchner, J. E. (2001). Short-term course of drinking in an untreated sample of at-risk drinkers. *Journal of Studies on Alcohol*, 62, 580-588. Ray, M. (1961). The cycle of abstinence and relapse among heroin addicts. *Social Problems*, 9, 132-140. Ray, M. B. (1968). Abstinence cycles and heroin addicts. In E. Rubington & M. Weinberg (Eds.), *Deviance: The interactionist perspective* (pp. 484-492). London: Macmillan. Scott, C. K., Foss, M. A., & Dennis, M. L. (2005). Pathways in the relapse-treatment-recovery cycle over 3 years. *Journal of Substance Abuse Treatment*, 28(Supplement 1), S63-S72. Schuckit, M. A., Tipp, J. E., & Bucholz, K. K. (1997). Periods of abstinence following onset of drug dependence in 1,853 men and women. *Journal of Studies on Alcohol*, 58, 581-589. Watson, C. G., & Pucel, J. (1985). The consistency of posttreatment alcoholics' drinking patterns. *Journal of Consulting and Clinical Psychology*, 53, 679-683.
- <sup>147</sup> Timko, C., Moos, R. H., Finney, J. W., Moos, B. S., & Kaplowitz, M. S. (1999). Long-term treatment careers and outcomes of previously untreated alcoholics. *Journal of Studies on Alcohol*, 60, 437-447.
- <sup>148</sup> Moyer, A., & Finney, J. W. (2002). Outcomes for untreated individuals involved in randomized trials of alcohol treatment. *Journal of Substance Abuse Treatment*, 23(2), 247-252.
- <sup>149</sup> Hubbard, R. L., & Marsden, M. E. (1986). Relapse to use of heroin, cocaine and other drugs in the first year after treatment. In *Relapse and recovery in drug abuse* (NIDA Research Monograph 72, pp. 247-253). Rockville, MD U.S. Government Printing Office. Hunt, W. A., Barnett, L. W., & Branch, L. G. (1971). Relapse rates in addiction programs. *Journal of Clinical Psychology*, 27, 455-456. Gossop, M., Green, L., Phillips, G., & Bradley, B. P. (1989). Lapse, relapse and survival among opiate addicts after treatment: A prospective follow-up study. *British Journal of Psychiatry*, 154, 348-353. Simpson, D. D., & Sells, S. B. (1990). *Opioid addiction and treatment: A 12-year follow-up*. Malabar, FL.: Krieger. Stephens, R., & Cottrell, E. (1972). A follow-up study of 200 narcotic addicts committed for treatment under the Narcotic Addict Rehabilitation Act (NARA). *British Journal of Addiction*, 67, 45-53.
- <sup>150</sup> Gossop, M., Marsden, J., Stewart, D. & Tracy, S. (2002). Change and stability of change after treatment for drug misuse: two year outcomes from the National Treatment Outcome Research Study. *Addictive Behaviors*, 27, 155-166.

of treatment discharge, 45% within 7 days, and 50% within 14 days. These data underscore the potential value in assertive approaches to post-treatment monitoring, support, and early re-intervention for both adults<sup>151</sup> and adolescents.<sup>152</sup> However, it should be noted that not all of those who return to use escalate back to levels of severity meeting diagnostic criteria; Some return to abstinence, and others maintain asymptomatic use.<sup>153</sup> Of those who resume use following an abstinence effort, as many as half do not return to dependent use in follow-up periods of less than five years.<sup>154</sup> Given this variability of outcome, all persons completing treatment should be provided assertive mechanisms of post-treatment monitoring and support.

### **Role of Community In Recovery:**

The effects of brief professional interventions on long-term recovery outcomes are more ephemeral than the more enduring roles of family and social support.<sup>155</sup> Recovery prevalence is influenced by personal and family factors, but also by broader historical, cultural, political, and economic influences that contribute to the wide disparity in resources and opportunities available to those who have developed severe AOD problems.<sup>156</sup> This suggests that recovery prevalence is shaped as much by community recovery capital as by the personal recovery capital of each community's citizenry.

### **Solution Perspective versus Problem Perspective:**

Scientific studies of the long-term resolution of alcohol and other drug problems have been relegated to the realm of afterthought in the alcohol/drug problems research arena. Substantial benefits could accrue from studying the prevalence, pathways, stages, and styles of

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- <sup>151</sup> Dennis, M. L., Scott, C. K., & Funk, R. (2003). An experimental evaluation of recovery management checkups (RMC) for people with chronic substance use disorders. *Evaluation and Program Planning*, 26(3), 339-352. Dennis, M. L., & Scott, C. K. (in press). Four-year outcomes from the early re-intervention (ERI) experiment using recovery management check-ups. *Drug and Alcohol Dependence*. McKay, J. R (2009). *Treating substance use disorders with adaptive continuing care*. Washington, D.C.: American Psychological Association.
- <sup>152</sup> Godley, M., Godley, S., Dennis, M., Funk, R., & Passetti, L. (2002). Preliminary outcomes from the assertive continuing care experiment for adolescents discharged from residential treatment. *Journal of Substance Abuse Treatment*, 23, 21-32.
- <sup>153</sup> Orford, J., Oppenheimer, E., & Edwards, G. (1976). Abstinence or control: The outcome for excessive drinkers two years after consultation. *Behaviour Research and Therapy*, 14, 409-418.
- <sup>154</sup> Gossop, M., Marsden, J., Stewart, D. & Tracy, S. (2002). Change and stability of change after treatment for drug misuse: two year outcomes from the National Treatment Outcome Research Study. *Addictive Behaviors*, 27, 155-166. Gossop, M., Stewart, D., Browne, N. & Marsden, J. (2002). Factors associated with abstinence, lapse or relapse to heroin use following residential treatment: Protective effects of coping responses. *Addiction*, 97(10), 1259-1267.
- <sup>155</sup> Moos, R.H. (1994). Why do some people recovery from alcohol dependence, whereas others continue to drink and become worse over time? *Addiction*, 89, 31-34; Moos, R.H. (1994). Editorial: Treated or untreated, an addiction is not an island to itself. *Addiction*, 89, 507-509.
- <sup>156</sup> Blomqvist, J. (2002). Recovery with and without treatment: A comparison of resolutions of alcohol and drug problems. *Addiction Research & Theory*, 19(2), 119-158.

long-term recovery, but these have not, until recently, been a subject of focused attention. Much of the data available about recovery in this analysis was extracted from the study of other issues, e.g., studies of the duration of treatment effects, relapse rates, and mortality rates. It is time for focused attention on the lived solutions to AOD problems at personal, family, organizational, community, and cultural levels.

### **Definition and Measurement:**

Challenges in defining and measuring recovery from significant alcohol and other drug problems can be overcome to generate national, regional, state, and local recovery prevalence data for purposes of planning, resource allocation, and program- and system-wide performance evaluation. The establishment of such a recovery-focused database should be a high priority at national, state, and local levels.

### **Recovery Mobilization:**

There is a significant population of individuals and families in recovery from alcohol and other drug problems in the United States who could be mobilized more widely to support prevention and early intervention programs, serve as volunteers in addiction treatment and recovery support programs, and provide leadership of AOD-related policy advocacy initiatives. Those who were once part of the problem constitute an underutilized resource in the search for fresh solutions to America's alcohol and other drug problems.

### **Recovery Momentum:**

Recovery momentum varies by problem severity and by social capital. Vaillant<sup>157</sup> found that socially disadvantaged men with severe alcohol dependence have a greater likelihood of stable remission than college-educated men exhibiting chronic alcohol abuse. Mild and severe problem severity generate their own momentum toward remission; Moderate problem severity combined with social advantage minimizes pressure towards remission. Studies of clinical populations suffering from severe, prolonged addictions—and selective media coverage of these same populations—create a pessimistic portrayal of the prospects for long-term recovery. “Insanity,” prolonged institutionalization, and death are not the normative outcomes of AOD problems. Recovery, rather than continual addiction or inevitable relapse, is the natural long-term course for substance use disorders.<sup>158</sup> Recovery is not an aberration achieved by a small morally enlightened minority. If there is a natural developmental momentum in the course of

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<sup>157</sup> Vaillant, G. E. (2003). A 60-year follow-up of alcoholic men. *Addiction*, 98, 1043-1051.

<sup>158</sup> Lopez-Quintero, C., Hason, D. J., de los Cobas, J. P., Pines, A., Wang, S., Grant, B. F., & Blanco, C. (2010). Probability and predictors of remission from life-time nicotine, alcohol, cannabis or cocaine dependence: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Addiction*, 106(3), 657-669. Price, R. K., Risk, N. K., & Spitznagel, E. L. (2001). Remission from drug abuse over a 25 year period: Patterns of remission and treatment use. *American Journal of Public Health*, 91, 1107-1113. Watson, C. G., & Pucel, J. (1985). The consistency of posttreatment alcoholics' drinking patterns. *Journal of Consulting and Clinical Psychology*, 53, 679-683.

AOD problems, it is toward remission and recovery. The probability of stable abstinence increases with age but is not inevitable: Substance use disorders may persist for decades without remission or deceleration.<sup>159</sup> The central problem is not making recovery possible—that is already a reality. It is instead the long duration of time between problem and intervention onset and successful recovery stabilization and maintenance—and the significant harm that can accrue to individuals, families, and communities in the interim.

### **Key Questions and Challenges:**

Recovery from a substance use disorder is more the norm than an anomaly. Given what we know about recovery prevalence and the natural momentum toward recovery, the central research, clinical, and policy questions are:

- What characteristics of the adolescent, family, treatment milieu, and community environment promote or inhibit the achievement of long-term recovery?
- What strategies can be used to enhance the resolution of less severe AOD problems (via the elevation of community recovery capital) without the need for professional interventions?
- How can addiction careers be prevented, quickly aborted, or shortened—and recovery careers extended—to reduce addiction’s toll on the individual, family, workplace, community, and society?
- What professional and peer support interventions can successfully elevate recovery outcomes for those with the greatest problem severity/complexity/chronicity and the least recovery capital?
- How can recovering people and their families be mobilized to break intergenerational cycles of AOD problem transmission and to serve as a healing force within their local communities and the country as a whole?

These questions lie at the center of the movement to shift addiction treatment from a model of acute biopsychosocial stabilization to a model of sustained recovery management for individuals, families, and communities.

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**Recovery/Remission from Substance Use Disorders:  
An Analysis of Reported Outcomes in 400+ Scientific Studies, 1868-2011**

**Appendix A**

**Recovery Prevalence Studies among Community Populations**

Abbreviations include: AOD = alcohol and other drug; IP = inpatient; OP = outpatient; SUD = substance use disorder; Tx = treatment; NA = not available in original study or paper in which study was reported, or ill-defined)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Lemere, 1952-53	Histories of 500 deceased alcoholics obtained from surviving family members	Absence of alcohol-related problems at time of death		43% (33% by abstinence)
Jones, 1958	Physicians under compulsory community supervision for past narcotic addiction	NA		92%
Bailey, 1967	12 originally reported alcoholics who had achieved normal drinking	Absence of alcohol-related problems	5 years	58% (50% by sustained controlled drinking; 8% by abstinence)
Robins, 1967	Community sample of men addicted to heroin	Heroin abstinence		80%
Barchha, 1968	88 patients with current or past alcoholism identified within 392 consecutive general hospital admissions	At least one year without drinking-related problems		42%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Cahalan, 1972 (Also reported in Cahalan, 1970)	978 males age 21-59	High severity heavy drinking or binge drinking in lifetime but not presently		55% (50% for heavy drinking; 60% for binge drinking)
Sobell, 1973	70	Abstinence or controlled drinking	6 months	49%
Robins, 1974	495 drug-positive soldiers returning untreated from Vietnam	Narcotic abstinence	1 year	98%
Robins, 1975	898 American soldiers serving in Vietnam; 495 who were drug positive at time of departure	Sustained remission from addiction	3 years	93%
Clark, 1976	615 of original community sample of 786	Remission of alcohol-related symptoms	4 years	59% remission for binge drinking and 78% remissions from early reported loss of control
Imber, 1976	83 men diagnosed as alcoholic in hospital emergency room with no alcoholism treatment provided	Continuous abstinence	1 and 3 years	19% at one year; 10% at 3 years
Roizen, 1978	521 untreated drinkers	Reduction of problems from baseline	4 years	40% (for those with serious alcohol problems at baseline)
Saunders, 1979	228 persons reporting that they drank too much in the past	Remission of past problem drinking		36%
Ojesjö, 1981	96 alcoholic men	Scoring of alcohol-related problems	15 years	30%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Vaillant, 1982	110 inner-city youth who later developed alcohol problems	Abstinence or controlled drinking	40 years	39% (34.5% abstinent; 4.5% controlled drinking)
Armor, 1983	500 untreated males and females with alcohol problems	Abstention or non-problematic drinking	2+ years	16%
Donovan, 1983	432 high school sample; 205 college sample	Remission of problem drinking	6-7 years	53% for former HS males; 70% for former HS females; 50% for former male college students; 80% for former female college students
Vaillant, 1983	100 patients admitted for alcohol withdrawal	Remission of problem drinking	8 years	35%
Wester-meyer, 1983	45 Chippewa Indians admitted for alcohol problems	Remission of problem drinking	10	21%
Fillmore, 1984	186 men aged 21-29 and 40-49	Remission of problem drinking	7 years	32% of younger cohort; 21% of older cohort
O'Connor, 1985	133 alcoholics	Abstinence or social drinking	20 years	41%
Taylor, 1985	99 male alcoholics	Abstinence or untroubled drinking	11+ years	40%
Mackenzie, 1986	85 male alcoholics	Abstinence or light drinking	8	44%
McCabe, 1986	57 married alcoholics	Abstinence or asymptomatic drinking	16+ years	61% of living subjects (abstinence or controlled drinking)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Hermos, 1988	1,517 community dwelling men	Abstinence or reduced drinking to non-problematic levels	9 years	27% of original community sample of men were in recovery at follow-up (4.9% quitters; 17.8% reducers) NOTE: Not all of the original sample had alcohol problems.
Kandel, 1989	Follow-up of 1,222 NY high school student drug users	No longer reporting marijuana or cocaine use	9-14 years	34% of men and 45% of women had stopped marijuana use; 49% of men and 56% of women had stopped cocaine use
Murphy, 1989	27 cocaine users in community population	Abstinence or controlled use	11 years	18.5% migrated from controlled to compulsive use and abstinence and 7% transitioned from controlled use to abstinence
Hasin, 1990	Follow-up of 1969 Cahalan & Room <sup>160</sup> community sample of 978 men over age 21; 71 initially indicating alcohol abuse and 109 indicating alcohol dependence	No longer reporting indicators of abuse or dependence	4 years	47% for alcohol abuse 39% for alcohol dependence
Muga, 1990	298 heroin addicts admitted to a general hospital	Abstention from heroin use	25 months	45.5%

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<sup>160</sup> Cahalan, D. & Room, R. (1974). *Problem drinking among American men*. New Brunswick, NJ: Rutgers Center of Studies of Alcohol.

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Helzer, 1991	Epidemiologic Catchment Area Study community samples in multiple cities	Meeting lifetime abuse dependence criteria but not in past year		51% for all alcohol use disorders; remission rates varied across sites but all fell in the 45-55% ranges; most remission cases report span of problem (Robins & Reiger, 1991, reported remission rates in this same study as 59% for drug abuse/dependence and 54% for alcohol abuse/dependence, p. 344.)
Moos, 1991	1,844 late-life problem drinkers admitted for medical services	Absence of drinking problems	1 year	29% (30% of initial total sample self-reported former but not current alcohol problems.)
Miller, 1992	99 problem drinkers treated via behavioral self-control training	Abstinence or asymptomatic use in past 12 months	3.5, 5, 7, and 8 years	36% (22% abstinence; 14% asymptomatic drinking)
Leung, 1993	Native American village; original sample of 100	Abstinence	Average 15 years	50%
Kessler, 1994	8,098 community sample aged 15-54	Remission from DSM-III-R diagnostic criteria	Lifetime rates compared to past year rates	42.5% remission rate (26.6% met criteria for a lifetime SUD but only 11.3% for past 12 months)
Schutte, 1994	1,620 late-life problem drinkers earlier admitted to 1 of 2 hospitals for medical care	Multiple measures	4 years	21%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Hasin, 1995	U.S. General population survey in 1988 (43,809)	Survey of former drinkers (8,057)		18.5% of U.S. adult population were former drinkers; 21% of former drinkers met DSM alcohol dependence criteria; 42% met DSM alcohol abuse criteria
Humphreys 1995	395 alcoholics who sought treatment but did not receive treatment	Not meeting DSM diagnostic criteria	3 and 8 years	49.4% in remission at 3 years; of those in remission at 3 years, 83.5% remained so at 8 years
Dawson, 1996	4,585 adults with prior alcohol dependence drawn from a national U.S. sample	Meeting lifetime but not past year criteria for alcohol abuse or dependence		72.2% (22.3% abstinence; 49.9% subclinical use)
Kendell, 1996	66 diagnosed but untreated alcoholics	Abstinence for previous 12 months or asymptomatic drinking	2-13 years	23% (15% abstinence and 8% normal social drinking)
Sobell, 1996a	Canadian national and Ontario population surveys of current/former adult drinkers and subset of problem and remitted drinkers	Absence of alcohol-related problems in past year	1+ year	10.5% remitted in Ontario; 3.1% remitted in national study; of the remissions in the national Canadian sample, 62% were abstinence and 38% moderation

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Vaillant, 1996	55 Harvard Undergrads and 150 inner city adolescents all meeting DSM criteria for alcohol abuse	Abstinence of more than 3 years or not meeting DSM criteria for abuse	Data reported on follow-up from age 40	50% for both groups
Hasin, 1997	Follow-up of 876 men in Cahalan & Room sample	No longer meeting DSM criteria for alcohol dependence	1 year	29% for alcohol dependence
Kandel, 1997	National Household Survey	Remission	1 year	75%
Cunningham, 2000	1,035 people with lifetime alcohol use disorders drawn from community survey of adult drinkers in Ontario, Canada	Remission for past 12 months		56.9% remission (11.5% abstinence)
Ojesjö, 2000	41 alcoholic men	Remission	46 years	39% for total sample; 52% for survivors; of these, 40% were abstinence and 60% were non-hazardous social drinking
Quintero, 2000	Navaho community sample	Remission	Lifetime but not past year	42.8%
Schuckit, 2000	435 highly educated men	Remission	5 years	82.5% for alcohol dependence; 69.6% for alcohol abuse
Swift, 2000	Survey of 200 long-term cannabis users	Reduced use	1 year	19% no use or use less than weekly

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Booth, 2001	733 problem drinkers identified from 12,000 households	Not meeting diagnostic criteria for alcohol abuse or dependence at any of the 3 follow-ups	6 months; 12 months; 18 months	38%
Newcomb, 2001	Community sample of 470 adults	Absence of DSM diagnostic criteria	4 years	62% for alcohol abuse; 48% for alcohol dependence
Price, 2001	841 Vietnam Veterans	Absence of AOD-related problems	25 years	33-48% across drug choices
Russell, 2001	221 untreated recovered alcoholics identified in community sample	Abstinence or not meeting hazardous drinking criteria for past year		Total sample was in recovery: 57.8% by abstinence; 42.2% via asymptomatic drinking 78% of recoveries had been maintained for 3+ years
Schutte, 2001	Community sample of late-life drinking problems: 140 in remission and 184 baseline problem drinkers	Absence of alcohol-related problems	10 years	30% for baseline problem drinkers; 71% who were remitted at 4 years remained so at 10 years; 25% of remitted were abstinent; 75% were drinking without problems



<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Von Sydow, 2001	3,021 age 14-24 community sample in Munich, Germany	Remission from cannabis abuse or dependence	42 months	56.6% (13.8% abstinence; 42.8% deceleration of use to subclinical levels)
Weisner, 2002	111 community sample	Abstinence or non-problematic use	1 year	35% (12% abstinence; 23% non-problematic use)
Schutte, 2003	447 older former problem drinkers	Not meeting diagnostic criteria	10 years	89% (Those in non-abstinent recovery were more likely to relapse than those in abstinent recovery at baseline.)
Vaillant, 2003	54 former Harvard undergraduates and 140 socially disadvantaged Boston adolescents	Not meeting diagnostic criteria for alcohol abuse or dependence	60 years	21% abstinence and 10.5% controlled drinking in college group; 32% abstinence and 1% controlled drinking in former inner city adolescents.
Vic, 2003	249 college students with a history of binge drinking in high school	No binge drinking in 3 months		22% reported no binge drinking in past 3 months.
Sherman, 2004	200 inner-city heroin injectors	Heroin abstinence	3 years	27.5%
Dawson, 2005	4,422 adults with prior to past year alcohol dependence	Not meeting DSM diagnostic criteria for past year		47.7% in full remission (18.2% abstinent; 11.8% asymptomatic drinkers; 17.7% low-risk drinkers) 27.3% partial remission
Kessler, 2005a,b	9,282 US community sample	Remission		74% of those with lifetime SUD in remission

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
McAweeney, 2005	134 alcoholic men	Remission	9 years	46%
Termorshui-zen, 2005	899 chronic drug users in Amsterdam addicted to heroin, cocaine, or amphetamine	Abstinence of at least 4 months	20 years	27%
De Bruijn, 2006	7,076 community sample in Netherlands	No longer meeting diagnostic status for alcohol use disorder	3 years	89% remission of those initially meeting DSM abuse criteria; 67% remission of those initially meeting DSM dependence criteria
Rumpf, 2006	144 adults who achieved remission from alcohol dependence without formal help	Not meeting diagnostic criteria for alcohol abuse or dependence	2 years	91% 82% if all those lost to follow-up are considered not in remission
Compton, 2007		Meeting DSM criteria for drug abuse or dependence in lifetime but not in past year		80% (81.8% for drug abuse; 76.9% for drug dependence)
Dawson, 2007	2,109 people who earlier met criteria for remission of alcohol dependence	No longer meeting diagnostic criteria for alcohol dependence	3 years	49% for previously asymptomatic drinkers; 72.8% of low-risk drinkers; 93.7% of abstainers

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Gilder, 2007	525 Southwest California Indians—159 meeting lifetime criteria for cannabis dependence	Not meeting DSM criteria for cannabis dependence in 6 months before interview		65%
Hasin, 2007	43,093 adults	Meeting lifetime DSM criteria for alcohol abuse or dependence but not in past year		71.9% (72.6% for alcohol abuse; 69.6% for alcohol dependence)
Edens, 2008	442 men and women originally identified with alcohol dependence in community survey	Remission	14 years	90.7% for men and 79.3% for women (some with subclinical problems); 37% of men and 45% of women report past-year recovery without evidence of any alcohol-related problems
Hser, 2008	629 heroin users; 694 cocaine users; 474 methamphetamine users	Decreased/moderate/low use patterns	10 years	54.5% (14% decreasing use; 35.5% moderate use; 5% low use)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Karno, 2008	12,297 individuals who met prior-to-past-year criteria for a substance use disorder	Not meeting diagnostic criteria in past year	Comparison of lifetime and past year reports	73% of total sample in remission; 80% for past substance abuse; 66% for past substance dependence; 77% for prior alcohol use disorder; 77% for prior drug use disorder; 62% for those with both alcohol and drug use disorder
Perkonig, 2008	Community survey of 3,021 14-24 year olds in Munich, Germany	No cannabis use in 12 months preceding follow-up	4 years	65% of users at baseline reported no use at follow-up; 30% of those who met criteria for cannabis abuse do not report any use 10 years later
Dawson, 2009	22,245 community sample	No longer meeting DSM diagnostic criteria	3 years	25% in full remission; 39% in partial remission
Evans, 2009	365 injection drug users in community	Cessation of drug injection for 3 or more months		29%
Jacob, 2009	420 men meeting lifetime criteria for alcohol dependence	Remission	15 years	50% of men meeting criteria for severe chronic alcoholism at age 41 no longer met those criteria at age 56

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery Definition</b>	<b>Follow-up Period (where applicable)</b>	<b>Recovery Rate</b>
Kalaydjian, 2009	5,692 respondents in National Comorbidity Survey Replication	Absence of diagnostic criteria for past 12 months	Comparison of lifetime and past-year reports	79% for alcohol abuse; 75% for alcohol dependence
Lopez-Quintero, 2010	43,093 community sample with sub-samples ranging from 408 to 6,937	No longer meeting diagnostic criteria		Lifetime rates were 83.7% for nicotine dependence; 90.6% for alcohol dependence; 97.2% for cannabis dependence; 99.2% for cocaine dependence
Penick, 2010	202 Danish males at high risk for alcoholism	Remission of alcohol use disorder	40 years	88% for alcohol abuse; 58% for alcohol dependence
Brennan, 2011	399 older men and 320 older women	Abstinence and remission of drinking problems	20 years	Overall reduction in alcohol-related problems; 22-23% abstinent at 20-year follow-up



**Recovery/Remission from Substance Use Disorders:  
An Analysis of Reported Outcomes in 400+ Scientific Studies, 1868-2011**

**Appendix B**

**Recovery/Remission Rates in Adult Clinical Studies<sup>161</sup>**

Abbreviations include: AOD = alcohol and other drug; IP = inpatient; OP = outpatient; SUD = substance use disorder; Tx = treatment; NA = not available in original study or paper in which study was reported, or ill-defined)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Superintendent's Report, 1868 (Reported in Howard, 1949)	228 discharged inebriates from New York State Inebriate Asylum	"reformed at follow-up"	Variable, up to 6 years	50%
American Association for the Cure of Inebriates, 1870 (Proceedings, 1870)	Reports from asylum directors at 1870 meeting	NA	NA	33% to 63%
Chicago Washingtonian Home Report, 1870 (Proceedings, 1870)	71 discharged patients	NA	NA	75.9% (54.9% cured; 21% hopeful)
New York Inebriate Asylum 1874 report	First patients treated at asylum	Temperate and total abstainers	Not reported	66.5%

<sup>161</sup> This Table incorporates data from the Calabria et al., 2010 review of remission studies.

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Chamberlain, 1891	3,212 men treated at New York Christian Home for Intemperate Men	Religious conversion and sobriety	Not reported	63%
Crothers, 1893	3,380 inebriates treated at Fort Hamilton	Not Reported	Not Reported	59.5% (43% doing well; 16.5% improved)
Bramwell, 1913 (Cited in Voegtlin, 1942)	76 treated alcoholics	Not defined	Not defined	84% (36.8% cured; 47.3% benefited)
Sausailoff, 1925 (Cited in Voegtlin, 1942)	1,284 treated alcoholics	Not defined	Not defined	80% "favorably influenced"
Reid, 1926 (Cited in Voegtlin, 1942)	Unreported	Abstinence and improved	Unreported	33% cured; 33% improved
Kruse, 1927 (Cited in Voegtlin, 1942)	1,104 treated alcoholics	Abstinence or improved	2 years	52% (24.7% abstinent; 27.4% improved)
Kinzler, 1930 (Cited in Bowman, 1942)	354	Abstinence or improved	4 years	38.1% (30.5% abstinent)
Spelten, 1931	4,000 treated alcoholics	3 years of abstinence following discharge	Not defined	33%
Hoffman, 1932	34 treated alcoholics	Abstinence or improved	2 years	47% "cured"
Bratz, 1933 (Cited in Voegtlin, 1942)	Patients discharged from European inebriate sanatoria	Abstinence for 2 years following discharge	2+ years	25%
Tillis, 1933 (Cited in Bowman, 1942)	1,000 treated alcoholics	Abstinence or improved	2 years	52.1% (24.7% abstinent)



<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Wolf, 1933 (Cited in Voegtlin, 1942)	1,082 patients treated in German inebriate asylum	Abstinence	2 years	25%
Gabriel, 1935 (Cited in Bowman, 1942)	1,109 alcoholic patients	Abstinence or improved	Not reported	42.2% (28% abstinent)
Kuron, 1937 (Cited in Voegtlin, 1942)	Men treated at Salvation Army	Abstinence	Unreported	40%
Tillotson, 1937 (Cited in Voegtlin, 1942)	43 treated alcoholics	Abstinence or improved	NA	68.9% (48% abstinent; 20.9% improved)
Tokarsky, 1938 (Cited in Bowman, 1942)	525 treated alcoholics	Abstinence	NA	13%
Bloomberg, 1939	21 alcoholics treated with Benzedrine sulphate	Abstinence	NA	66.6% (38% with continuous abstinence)
Silkworth, 1939	Unreported number of AA members observed following detoxification and AA involvement	Abstinence	4 years	50%
Lemere & Voegtlin, 1940	538 alcoholic patients treated with aversive conditioning	Abstinence	4 years	64.3%
Bowman, 1941	Review of seven studies	Abstinence	2-4 years following treatment	25-30%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Durfee, 1942 (Cited in Voegtlin, 1942)	Unreported number of treated alcoholics	Abstinence of 1 year or greater	NA	75%
Hock, 1942 (Cited in Voegtlin, 1942)	2,000 AA members	Continual abstinence without relapse	6 years	35%
Pescor, 1943	4,766 narcotic addicts-Lexington	Narcotic abstinence	6 months to 5 years	13.5%
Van Amberg, 1943	50 women alcoholics	Abstinence	1 year	19.6% (10.9% abstinent; 8.7% via moderated drinking)
Wall, 1944	100 treated male alcoholics	Abstinence or decreased drinking and improved functioning	3-8 years	43% (24% abstinence; 19% drinking but improved)
Voegtlin, 1949	2,325 patients treated with aversive conditioning	Continuous abstinence	1-10.5 years	44.8% of whole sample (85% at 6 months; 70% at 1 year; 40% at year 4; 25% at year 10)
Lemere, 1950	4,096 alcoholic patients treated with aversive conditioning	Abstinence	1-13 years	51% at final follow-up (44% continuous abstinence; 39% abstinence for those who relapsed and were re-treated)
Lemere (& O'Hallaren), 1950	503 alcoholic patients	Abstinence	3 months to 3.3 years	57% abstinent since treatment

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Prout, 1950	100 male alcoholics	Abstinence or improved functioning	Up to 8 years	55% (25% abstinent; 30% improved)
Knight, 1951	75 patients treated in psychiatric hospital for opioid or barbiturate addiction	Abstinence and improved categories	Less than 2 years	36% (20% abstaining at follow-up; 16% improved)
Hoff, 1953	560 treated alcoholics	Abstinence or improved	5 years	79.2% (38.4% abstinence; 21.2% single relapse; 19.6% improved)
Wattenberg, 1954	770 homeless alcoholics	Abstinence	Variable	9%
Davies, 1956	50 treated alcoholics	Abstinence or improved	2 years	64% (14% abstinence; 50% much improved or improved)
Nørvig, 1956	114	Abstinence	6-8 years	32%
Pfeffer, 1957	60 treated alcoholic employees	Abstinence or drinking but improved in preceding two years	Up to four years	92% (80% abstinence; 12% changed drinking pattern)
Selzer, 1957	131 alcoholics treated at a state hospital	Absence of alcohol-related problems	6 years	22% continuous abstinence; 16% became "social drinkers"
Fox, 1959	251 alcoholic patients	Abstinence and social adjustment	2 years	39% (30% abstinence)
Miller, 1959 (cited in Edwards, 1966)	40 treated alcoholics	"success rate"	9 months	91%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Mindlin, 1959	173 treated alcoholics	Abstinence plus social adjustment	NA	50.3%
Thorpe, 1959	278 employees referred to medical department for alcohol-related problems	At least 1 year of abstinence or improved (work performance)	3-11 years	46.8% (18.3% abstinence)
Clancy, 1961	25 male patients treated at alcoholism clinic	Continuous abstinence	6 months	45%
Gerard, 1962	400 treated alcoholics	Abstinence or asymptomatic drinking	2-8 years	32% (18% abstinence; 14% asymptomatic drinking)
Hunt, 1962	1,881 patients discharged from Lexington	Abstinence from heroin use or irregular use	1-4.5 years	9.9% (6.6% abstinent; 3.3% irregular use)
Winick, 1962	16,725 narcotic addicts known to the Federal Bureau of Narcotics via arrest or institutionalization between 1953-1954	Becoming inactive—no record of arrests or institutionalization	5-6 years	65% became inactive
Brunn, 1963	303 treated alcoholics	Cured (abstinence or asymptomatic drinking) or changed (enhanced social psychological functioning)	2-3 years	47.7% (17.3% cured and changed; 3.5% cured only; 26.9% changed only)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Duvall, 1963	453 treated narcotic addicts	Voluntary narcotic abstinence	2 years and 5 years	17% at 2 years; 25% at 5 years
Rossi, 1963	149 male treated patients	Abstinence of drinking with mild effects	6 months	39.5% (9% abstinent; 39.5% drinking with mild effects)
Wolf, 1963	270 treated alcoholics	Abstinence	2+ years	62.4% abstinent
O'Donnell, 1964	122 treated narcotic addicts	Narcotic abstinence	1-24 years	41%
Clancy, 1965	90 male patients treated at alcoholism clinic	Improvement or abstinence	One year	45% (27% continuous abstinence)
Robson, 1965	100 treated alcoholics	Abstinence	10-46 months	62%
Vallance, 1965	68 male alcoholics	Improved	2 years	25%
Edwards, 1966	40 alcoholics	Good, fair, poor outcome	1 year	65% (55% good; 10% fair)
Kendell, 1966	50 male and female treated alcoholics	Remission via abstinence or "normal" drinking	4 years	22% abstinent; 10% "normal" drinking
Moore, 1966	Survey of 102 state hospitals on estimate of improvement rate for their alcoholic patients	"Improvement"	NA	39% less than 1 year; 33% more than 1 year

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Myerson, 1966	100 treated Skid-Row alcoholics	Abstinence, employment, and family reintegration	6 years	46% (22% fully rehabilitated; 24% improved drinking without community reintegration)
Rathod, 1966	100	Abstinence and benefited	2 years	52% (43% continuous abstinence; 9% benefited but not abstinent)
Vaillant, 1966a          Vaillant, 1966c	100 male heroin addicts treated at Lexington	Heroin abstinence for 3 years or longer during follow-up period	12 years	46% drug free in the community at the time of death or follow-up (although 90% returned to drug use after treatment)          52% (30% continuous; 11% essentially abstinent; 4% with 3 years abstinence who later relapsed; 5% with sustained abstinence but last 2-year status unknown; 2% abstinent at death) <sup>162</sup>

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<sup>162</sup> These numbers decline when secondary drug use is factored in: 14% substituted alcohol for heroin, with 6% suffering alcohol-related impairment to health or occupational functioning.

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Pemberton, 1967	50 male and 50 female alcoholics	“successful adjustment”	8-24 months	20% success with females; 36% success with males
Barchha, 1968	82 medical patients with secondary diagnosis of alcoholism	Remission and complete abstinence	NA	33.3%
Bowen, 1968	79 treated alcoholics	Abstinence	1 year	19% (25% for completers)
Gallant, 1968	19 treated alcoholics	Complete abstinence maintained for study period	1 year	26.3% for whole sample
Kissen, 1968	480 treated alcoholics	Multiple success criteria	3 years	3 treatment groups: success reported as 17.4%, 20%, and 19.5%
Pattison, 1968	32 treated male alcoholics	Abstinence or asymptomatic drinking	1 year	68.7% (34% abstinence; 34% asymptomatic drinking)
Pokorny, 1968	88 treated male alcoholic veterans	Abstinence of mild social drinking	1 year	57.9% (31.8% abstinent; 26.1% mild social drinking)
Reinert, 1968	156 treated alcoholics	Abstinence or social drinking	1 year	22.6% (20% abstinence; 2.6% non-problematic drinking)
Ritson, 1968	100 treated alcoholics	Abstinence or improved	6 months	69% (47% abstinent; 22% improved)

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Ball, 1969	242 heroin addicts from Puerto Rico treated at Lexington	Continuous opioid abstinence for at least 3 years	7+ years	19.4%
Gillis, 1969	797 alcoholic patients treated in state hospital	Abstinence with and without minor relapses	1-4 years	41% (16% continuous abstinence; 25% abstinence with "occasional breaks")
O'Donnell, 1969	266 narcotic addicts treated at Lexington	Abstinence	12 years	23% (10% continuous abstinence; 13% "much abstinence")
Ferguson, 1970	115 American Indian alcoholics	Elimination of destructive drinking	2 years	22.6%
Lovibond & Cady, 1970	28 problem drinkers treated in first controlled drinking program	Improvement	16 weeks to 2 years	85% improvement at 16-60 weeks; 59% improvement at 2 years
Rohan, 1970	178 alcoholic veterans	Continuous or present abstinence	2-30 months	60% (31% continuous abstinence)
Tomsovic, 1970	260 treated alcoholics	Abstinence or improvement	3, 6, and 12 months	45% (18% abstinent; 5% much improved; 22% improved)
Fitzgerald, 1971	392 men and 192 women treated at state hospital for alcoholism	Continual abstinence; essential abstinence; asymptomatic use	4 years	44% (29% continual abstinence)



<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow- up</b>	<b>Recovery Rate</b>
Goodwin, 1971	93 male alcoholic felons	No alcohol-related problems in the past 2 years	8-9 years	40%
Hunt, 1971	Review of multiple studies	Abstinence	1 year	20%
Kish, 1971	173 alcoholic veterans	Abstinence and improvement	1 year	48% (14.5% abstinence; 7.5% 1 relapse; 26% occasional drinking; 7.5% regular asymptomatic drinking)
Lanaenauer, 1971	252 narcotic addicts	Abstinence from opioids and other drugs	6 months	50%
Bowden, 1972	63 treated narcotic addicts	No opioid use for 6 months	NA	22%
Knox, 1972	54 male alcoholics treated at VA hospital	Abstinence during period of follow-up	4 years	15.9% abstinent
Levy, 1972	50 narcotic addicts	Abstinence or only isolated use	5 years	40% (18% abstinence; 22% only isolated use)
Shore, 1972	624 treated American Indian alcoholics	Abstinence or mostly abstinence with some relapse episodes		56% (28% abstinence; 28% mostly abstinence with some relapse episodes)
Stephens, 1972	200 male narcotic addicts committed under NARA	Narcotic abstinence for at least 6 months	2+ years	13%

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Zimberg, 1972	78 treated alcoholics in Harlem	Abstinence or minimal use	1 year	42.3%
Snow, 1973	3,655 cases from New York City Narcotics Register	No reports indicating narcotic use	9 years	23%
Sobell, 1973	70 patients treated in controlled drinking program	Abstinence, controlled drinking, improved	3 years	50% (abstinent, controlled, or improved)
Tomsovic, 1973	179 alcoholic patients	Abstinence or improvement	1 year	65% (28% abstinence) for binge drinkers; 58% (31% abstinence) for continuous drinkers
Vaillant, 1973	100 narcotic addicts treated at Lexington	Prolonged opioid abstinence	20 years	35%
Van Dijk, 1973	211 treated male alcoholics		2.5-5.5 years	49% changed positively (22.5% abstinence; 10% moderation; 16.5% improved with sporadic excessive drinking)
d'Orban, 1974	66 treated narcotic addicts	"off narcotics" at point of follow-up	4 years	47% at point of follow-up

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Emrick, 1974	Survey of alcoholism treatment outcome literature	Variable	Variable	39.6% average recovery rate (33.8% by abstinence; 5.8% by controlled drinking)
Smart, 1974	100 employed alcoholics	Degrees of improvement	12-14 months	87% (76% highly improved; 11% moderately improved)
Emrick, 1975	Survey of 126 studies of psychologically oriented alcoholism treatments	Abstinence	Variable	13% of untreated abstinent at follow-up and 41% somewhat improved; 21% of minimally treated abstinent and 43% somewhat improved
Wilson, 1975	83 American Indian treated alcoholics	Complete abstinence in past year	18 months	44% improvement (28% complete abstinence)
Armor, 1976	2,339 treated alcoholics	Improvement: abstinence or asymptomatic drinking or cycling between the two	6 and 18 months	70% (24% by abstinence past 6 months)  (This was reduced to less than 40% in a subsequent reanalysis published in Polich et al., 1980.)

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Ewing, 1976	35 patients treated in experimental controlled drinking program	Asymptomatic drinking	27-55 months	0% of patients (high early attrition; only 9 patients attended more than 12 sessions; all patients resumed uncontrolled drinking with 64% subsequent abstinence at follow-up)
Hyman, 1976	54 alcoholics treated in OP clinic	Abstinence at follow-up	15 years	13%
Orford, 1976	65 treated alcoholics	Abstinence; abstinence with only 1 slip; asymptomatic drinking	2 years	29% (16.9% abstinent; 12.3% asymptomatic drinking)
Anderson, 1977	110 alcoholic men treated in VA alcoholism treatment unit	Abstinence or non-destructive drinking	1 year	82% (38% abstinence; 44% non-destructive drinking)
Costello, 1977	Analysis of 80 alcoholism treatment outcome studies	Abstinence	At least 12 months	26%
Gillis, 1977	7 addictive drinkers in South Africa	Improvement/ abstinence	6 years	42.9% (28.6% completely abstinent)
Ogborne, 1977	100 TC residents	Abstinence from drugs other than alcohol and reduced use	6+ months	29% (17% abstinence; 12% sporadic use)

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Miller, 1978	46 voluntary problem drinkers and 17 court-referred problem drinkers completing 1 of 3 controlled drinking treatment programs	Abstinence or controlled drinking	12 months	58.7% (8.7% by abstinence; 50% by controlled drinking)
Savage, 1978	1,409	Abstinence from opioid and non-opioid drug use	4-6 years	42% in first 3 years
Simpson, 1978	1,409 patients in drug treatment programs	Abstinence	3 years	14% abstinent from alcohol; 76% abstinent from opioids; 78% abstinent from non-opioids other than marijuana; 43% abstinent from marijuana
Bromet, 1979	262 "low bottom" and 167 "high bottom" treated alcoholics	Abstinence or asymptomatic drinking	6-8 months	37% for "low bottom" patients (15% abstinence; 22% drinking moderately) 75% for "high bottom" alcoholics (46% abstinence; 29% drinking moderately)
Harrington, 1979	51 narcotic offenders	Opioid abstinence	20 years	2% voluntarily abstinent

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Kern, 1979	132 treated alcoholics	Abstinence	6 months	42% continuous abstinence; additional 18% abstinent for 5 of 6 months
Paredes, 1979	342 treated alcoholics	Abstinence or asymptomatic use for those not in remission at admission	6, 12, and 18 months	54% at 6 months; 65.7% at 18 months
Smart, 1979	157 male and 157 female treated alcoholics	Abstinence and improvement	1 year	42.7% for men (14% abstinence; 28.6% much improvement); 47.1% for females (14.6% abstinence; 32.5% much improvement)
Finney, 1980	113 patients treated for alcoholism	Abstinence past month	2 years	68% at 6 months; 40% at 18 months
Finney, 1981	131 treated alcoholics	Abstinence and controlled drinking	2 years	42.7% at 2 years 72.5% at 6 months (65.6% abstainers; 5.3% moderate drinkers)
Maddux, 1981	248 opioid addicts	Opioid abstinence	30 years	24% at four-year follow-up
Polich, 1981	548 male alcoholics treated in 1 of 5 residential programs	Abstinence or controlled drinking	4 years	46% (28% abstinent; 18% drinking without dependence symptoms)

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Gottheil, 1982	171 treated alcoholic veterans	Abstinence or controlled drinking	6, 12, and 24 months	54.9% at 6 months; 54.9% at 12 months; 55.5% at 24 months
Pettinati, 1982	150 men and 75 women treated for alcoholism	Abstinence and quality of adjustment	4 years	76% (46% with abstinence and good adjustment)
Edwards, 1983	99 married alcoholics	Social adjustment	11 years	40% "good outcome" (19% continuous abstinence; 8% social drinking)
Gordon, 1983	60 male patients treated at a drug clinic in London	Lack of conviction or knowledge of drug use 5 years preceding follow-up	10 years	40.8%
Graeven, 1983	151 treated and untreated heroin addicts	Heroin abstinence	1-9 years	52% for untreated group; 50% for those with 1-2 treatment experiences
Miller, 1983	82 treated problem drinkers	Abstinence, controlled drinking, improved	2 years	54.8% (14.6% abstinence; 36.5% controlled drinking; 15.8% improved)
Smith, 1983 (reported in Finney, 1991)	NA	Remission	11 years	47%
Vaillant, 1983	110 men and women admitted to inpatient alcoholism treatment ward	Abstinence of 3 past years or longer at follow-up	8 years	34% (59% if six-month abstinence criteria within 8 years was used)

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Sanchez-Craig, 1984	70 early-stage problem drinkers	Abstinence or controlled drinking	2 years	73% in 1 treatment group; 72% in second group
Cottrell, 1985	83 British opioid addicts	Opioid abstinence	11 years	44.6%
Helzer, 1985	1,289 treated alcoholics	Remission	2-4 years	33.4% (15% abstinent; 4.6% mostly abstinent; 1.6% stable moderate drinking; 12.2% heavy non-problem drinkers)
O'Connor, 1985	133 alcoholics	Remission	20 years	82.5% (67.5% abstinence; 15% asymptomatic drinking)
Elal-Lawrence, 1986	139 alcoholics who had received inpatient treatment	Abstinence or asymptomatic drinking	1 year	67.5% (31.6% abstinence; 35.9% controlled drinking)
Fuller, 1986 (Cited in Miller 2001)	NA	Abstinence	1 year	19.2%
Hubbard, 1986	2,280 clients admitted for detox or treatment	Abstinence	4-6 years	12%
Kosten, 1986	268 opioid addicts	Continuous abstinence	2.5 years	30%
Makenzie, 1986	85 male alcoholics treated in inpatient treatment center	Change in drinking classification	8 years	44% (27.7% abstinent; 7% light drinkers; 9% drinking then abstinent at end of follow-up)



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McCabe, 1986 (Reported in Finney, 1991)	57 formerly treated, married alcoholics	Remission	16.6 years	65%
Nordstrom, 1986	70 male alcoholics	No problems at follow-up	20 years	57.1%
Simpson, 1986	490 opioid addicts	Opioid abstinence	12 years	57% opioid abstinent at 12-year follow-up
Nordström, 1987	55 male treated alcoholics	Abstinence or asymptomatic drinking	20 years	58% (20% abstainers; 38% controlled drinkers)
Rychtarik, 1987	43 patients treated for alcoholism with behavioral therapy	Abstinence and absence of alcohol-related problems during 6 months preceding follow-up	5-6 years	35% (21% by abstinence; 14% via moderate drinking)
Watson, 1987	42 treated alcoholics previously identified by collaterals as controlled drinkers following treatment	Absence of alcohol consumption that interfered with subject's life, relationships, and work	2 weeks to 18 months after discharge	47% were controlled or abstinent at last follow-up; 69% were rated as uncontrolled drinking or institutionalized during one of the follow-ups in the first year
O'Sullivan, 1988	300 alcoholics with and without affective disorder	Abstinence	2 years	38.5% (44% unipolar; 33% bipolar; 38% primary alcoholism)

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Smith, 1988	60 adult patients treated for cannabis dependence	Continuous abstinence from cannabis	6 and 12 months	75% at 6 months; 84.2% at 12 months
Dorus, 1989 (Cited in Miller, 2001)	457 male alcoholic veterans treated with lithium	Abstinence	12 months	33.1%
Gossop, 1989	80 patients treated for opioid addiction	Opioid abstinence	6 months	51% (19% continuous abstinence; 31% used after treatment but no longer using at follow-up)
Cross, 1990	200 male and female treated alcoholics	Remission	10 years	76% of surviving sample was in remission
Joe, 1990	490 treated narcotic addicts	Narcotic abstinence	12 years	75%
Keso, 1990	141 employed alcoholics treated for alcoholism	Abstinence	1 year	26.3% in Hazelden-type treatment; 9.8% in traditional treatment
Loosen, 1990	29 alcoholic men abstinent for 2 or more years	Continuous abstinence	2 years	79% maintained their recoveries; 21% who resumed alcohol use all had less than 5 years of sobriety
Finney, 1991	124 treated patients/families	Multiple criteria including absence of alcohol-related problems	2 years, 10 years	57% at 10 years

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Walsh, 1991	227 workers referred for alcoholism treatment	Abstinence	2 years	41% abstinent at follow-up; 23% continuous abstinence
Booth, 1992	100 patients treated for problem drinking	Success: No more than 7 days of heavy drinking in past 12 months	1 year	27% "successful"
Frawley, 1992	156 patients admitted for inpatient treatment	Abstinence at follow-up	1 year	53%
Hoffman, 1992	8,087 inpatients and 1,663 outpatients treated for addiction	Abstinence	6 months and 12 months	60% for inpatients; 68% for outpatients at one year; 67% for inpatients; 75% for outpatients at 6 months
Powell, 1992	360 co-morbid male alcoholics	Abstinence or only occasional drinking	1 year	35% (25% continuous abstinence; 10% only occasional drinking)
Carroll, 1993	100 AA members	Continuous abstinence since joining AA	7 days to 33 years	65%
Hser, 1993	581 male narcotic addicts in CA civil commitment program	Self-reported abstinence and negative urine screen for opiates	24 years	20-22% reported abstinence; 25% negative in drug screen
Kosten, 1993	72 patients treated for cocaine dependence	Abstinence	6 months	31.9% abstained for 3 weeks or longer during study

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Langle, 1993	96 alcoholic patients	Complete abstinence	5 years	28.1%
McLellan, 1993	198 employed alcohol or cocaine dependent patients	Continuous abstinence	6 months	59%
Carroll, 1994	121 treated cocaine dependent individuals	Continuous abstinence following treatment	1 year	28%
Timko, 1994	515 initially untreated problem drinkers	Abstinence past 6 months	1 year	16.3% no treatment; 41% AA only; 29% outpatient treatment; 52% inpatient treatment
Yates, 1994	299 male patients treated for alcoholism in IP unit	Continuous abstinence	1 year	54.5% at 3 months; 37.2% at 6 months
Bartels, 1995	Follow-up of 148 patients with severe mental illness and substance use disorder	Abstinence	7 years	30% (25% for alcohol use disorders and 35% for drug use disorders)
Christo, 1995	101 treated drug users abstinent from their drug choice at baseline	Abstinence	6 months	46%
Humphreys, 1995	135 problem drinking individuals	Absence of alcohol-related problems	3 years	69.8% (21.5% abstinent; 48.3% moderate drinkers)

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Miller, 1995	8,080 treated patients	Abstinence	NA	60%
Paille, 1995	538 patients	Abstinence and reduced use	12 months	34.7% and 27.7% in two main treatment groups
Timko, 1995	439	Abstinence for at least 6 months	3 years	40%
Hasin, 1996	127 dually diagnosed patients	Remission of alcoholism and depression	5 years	74% (66.1% remission of alcoholism and depression; 7.9% remission of alcoholism but not depression)
Hoffman, 1996	184 cocaine dependent individuals	Cessation of regular cocaine use	1 year	77%
Jin, 1996	77 male alcoholics with at least 18 months of continuous abstinence	Abstinence	2-17 years	69% maintained abstinence throughout follow-up; Risk of relapse declines after 5 years of abstinence
Lowman, 1996	563 treated alcoholics	Abstinence	1 year	25.5%
Lerner, 1997	72 heroin addicts treated with naltrexone	Remission/no readdiction	5 years	81.8%
Ouimette, 1997	3,698 treated veterans	Abstinence	12 months	20.8%

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Patterson, 1997	127 white male alcoholics	Complete abstinence	5 years	43% abstinent year prior to 5-year follow-up; 36% for complete five years
Project Match, 1997	952 clients treated in OP; 7,743 in aftercare Tx	Complete abstinence through follow-up period	12 months	19% of OP clients; 35% of aftercare clients
Shaw, 1997	112 treated alcoholics	Abstinence	9 years	85% (53% abstinent; 15% controlled; 16% improved)
Carroll, 1998	122 patients treated for alcohol/cocaine abuse	Alcohol and cocaine abstinence for at least 3 weeks during treatment		5 treatment conditions: 48%; 46%; 22%; 22%; and 6%
Project Match, 1998	806 treated patients diagnosed with alcohol abuse or dependence	Multiple criteria, including abstinence	37-39 months	30%
Stinchfield, 1998	1,083 MN Model Treatment	Abstinence and reduced drinking	1 year	88% (53% abstinence; 35% reduced AOD use)
Curran, 1999	298 male alcoholics treated in VA	Abstinence at all follow-ups	3, 6, 9, and 12 months	26.2% at 12 months
Gossop, 1999	408 English drug users admitted to residential drug treatment	Abstinence from all drugs during 3 months preceding follow-up	1 year	37%

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Hser, 1999	507 patients treated for cocaine dependence in 18 residential programs	Cocaine abstinence during entire follow-up period	1 year	63% for first admissions; 50% for repeat admissions
Simpson, 1999	1,605 patients treated for cocaine dependence	Cessation of regular use; absence of cocaine-related problems	1 year	77% remitted from regular cocaine use; 58% remitted from cocaine-related problems
Stephens, 1999 (Reported in McRae, 2003)	212 treated cannabis dependent adults	Abstinence and improved categories	1 year	36% (17% abstinence; 19% improved)
Bacchus, 2000	104 opiate addicts	Opioid abstinence at follow-up	2-3 years	58%
Brecht, 2000	98 patients treated for methamphetamine dependence	Methamphetamine abstinence	19 months	49%
Byrne, 2000	Methadone patients	Heroin abstinence for 3 months	8+ years	39%
Foster, 2000	82 alcohol-dependent men and women admitted to detox	Abstinence	12 weeks	39%
Hser, 2000	242 treated heroin addicts in CA civil commitment programs	Heroin abstinence at follow-up	33 years	23% of total original sample; 55.8% of interviewed survivors

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Moos, 2000	21,000 patients treated in VA for a substance use disorder	Abstinence	1 year	42% without mental health care added; 52.9% with mental health care added
Ojesö, 2000	41 alcoholic males	No longer meeting DSM diagnostic criteria	40 years	52% of survivors
Sees, 2000	858 methadone patients	Cessation of illicit opioid use	12 months	50%
Stephens, 2000 (Reported in McRae, 2003)	291 cannabis dependent adults	Abstinence	16 months	28-29% across two study groups
Timko, 2000	466 alcoholic men	No longer meeting DSM criteria/abstinence	8 years	Remission at 8 years: 62.1% AA only; 55.4% treatment only; 63% AA and treatment; Abstinence at 8 years 48.5%; 45.9%; and 57.7% respectively
Walters, 2000	Analysis of studies published between 1984-1997 of spontaneous remission of AOD problems	Remission or complete abstinence	1-27 years	26.2% average remission; 18.2% complete abstinence
Haver, 2001	120 Swedish female alcoholics	Remission	2 years	57%



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Hser, 2001	242 treated heroin addicts in CA civil commitment programs	5 years of heroin abstinence prior to follow-up	33 years	43%
Miller, 2001	Review of 7 large multisite alcoholism treatment outcome studies	Abstinence	1 year	34.5% (Average of 24.1% 12 months continuous abstinence and 10.4% moderated drinking)
Schuckit, 2001	1,346	Abstinence and remission	5 years	29% in remission at 1 year; 33% remission for alcohol dependence at 5 years; 50% remission for alcohol abuse at 5 years
Siegel, 2001	229 treated crack cocaine users	Abstinence	6 and 12 months	54.6% at 6 months; 46.3% at one year
Galanter, 2002	47 cocaine dependent patients	Urine negative for cocaine for 3 sessions preceding follow-up	12 weeks	43%
Gossop, 2002	242 clients treated in residential programs	Complete abstinence from heroin	12 months	40%

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Gossop, 2002	549 treated clients in 54 UK programs	Abstinence from all primary and secondary drugs during 3 months prior to follow-up	1 and 2 years	35% at year 1 and 37% for year 2 for residential programs; 15% for year 1 and 24% for year 2 in community OP clinics.
Greenfield, 2002	100 alcoholics treated following inpatient treatment	No alcohol use in prior 12 months	1 year	24%
Hasin, 2002	250 alcohol, cocaine, or heroin dependent patients	Remission	6, 12, and 18 months	47% with remission of at least 26 consecutive weeks; 18% with continuous abstinence; 26% with sustained remission
Moyer, 2002	Meta-analysis of treated and untreated controls	Abstinence	Variable	21% for untreated; 43% for treated sample
Okruhlica, 2002	351 heroin dependent patients	Opioid abstinence	3 years	51%
Prendergast, 2002	Meta-analysis of 78 studies of drug treatment	Success rate		Average 57% success rate across 78 studies
Rawson, 2002	114 methamphetamine users admitted to treatment	Methamphetamine abstinence	2-5 years	82.5%

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Ritsher, 2002	2,805	Not meeting DSM diagnostic criteria at time of follow-up	2 years	25% at 1 year; 28% at 2 years
Siegal, 2002	229 treated crack cocaine users	Cocaine abstinence	18 months	63%
Simpson, 2002	708 clients treated for cocaine dependence	No cocaine use in the past 12 months	1 and 5 years	42%
Stephens, 2002	450 treated adults with cannabis dependence	Cannabis abstinence in previous 90 days	4 months	22.6%
Timko, 2002	466 patients treated for an alcohol use disorder	Abstinence, no alcohol-related problems, remission	8 years	At one year, abstinence 68.9% for women and 58.3% for men; no drinking problems 58.7% for women and 43.6% for men; remission 51.9% for women and 40.8% for men)
UKATT Research Team, 2002	689 patients treated for alcohol problems	Reduction in alcohol problems	3 months and 12 months	No % of abstinence rate reported; total sample reported increase in days of abstinence to 46%, and alcohol-related problems had decreased for sample by 50%
André, 2003	20 violent patients treated for addiction	Abstinence	3-24 months	60%

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Bond, 2003	367 men and 288 women seeking alcohol treatment	Abstinence	1 and 3 years	52.6% at one year; 47.7% at 3 years
Dennis, 2003	448 treated adults	Not in need of treatment as assessed by multiple criteria	24 months	51% for total sample
Flynn, 2003	432 outpatient methadone treatment patients	Multiple criteria—no opioid or cocaine use, no daily alcohol use, no criminality	5 years	28%
Gerra, 2003	265 methadone maintenance patients	Abstinence from illicit drugs	Variable	35.5%
Gossop, 2003	418 patients treated in 54 UK addiction treatment agencies	Abstinence from illicit drug use	1, 2, and 4-5 years	26% of methadone patients and 38% of residential patients were abstinent at 4-5 years
Moore, 2003	82 patients treated for cannabis dependence	Abstinence	6 months	29%
Ouimette, 2003	193	Abstinence or absence of AOD-related problems	5 years	27%
Verachai, 2003	247 persons treated for drug dependence in a TC	Abstinence from heroin at follow-up	5 years	71%
Weisner, 2003a	784 patients treated for a substance use disorder	Abstinence 30 days prior to follow-up	6 months and 5 years	59% at 6 months; 52% at 5 years

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Rawson, 2004	978 patients admitted for methamphetamine dependence	Urine sample free of methamphetamine at follow-up	6 months	69%
Satre, 2004	92 treated alcohol dependent patients	Abstinence in prior 30 days	6 months	79.3% of women; 54% of men
Aharonovich, 2005	250 adult patients treated for heroin, cocaine, or alcohol dependence	At least 26 weeks of abstinence following discharge	6, 12, and 18 month follow-up	53%
Bottlender, 2005	74 patients treated in OP alcoholism clinic	Abstinence	3 years	55% (43% abstinence; 12% improved)
Dennis, 2005	1,271 treatment admissions	Abstinence for at least 12 months	3 years	47%
Domino, 2005	292 treated health care professionals	Continuous abstinence	1-5 years	74.6%
Grella, 2005	951 patients admitted to addiction treatment	Abstinence in past 6 months	3 years	46%
Ilgen, 2005	2,967 patients treated in VA addiction treatment units	Abstinence during 3 months prior to follow-up	1 year	31%
Kaskutas, 2005	349 dependent drinkers entering treatment	Abstinence 30 days prior to follow-up	5 years	46% for low AA attenders and 86% of high AA attenders at one year

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Kelly, 2005	2,095	Abstinence and remission	1 and 5 years	45.4%, 49.8%, and 46.4% remission across 3 study groups (abstinence rates were 39%, 44.7%, and 41.3%)
Mann, 2005	70 patients treated for alcoholism	Abstinence	5, 10, 16 years	68% (54.2% abstinent; 14.2% improved)
Moos, 2005	461 help-seekers who received or refused treatment	Multiple criteria on alcohol-related problems	1, 3, 8, and 16 years	24% for no help group; 42% for helped group
Rathod, 2005	86 patients treated for heroin addiction	Opioid abstinence	33 years	36% of original cohort—80% of those still living were not using opioids
Ray, 2005	604 patients treated for a substance use disorder	Abstinence for 30 days prior to follow-up interview	5 years	54%
Scott, 2005	448	No use or problems while living in the community	2 years	42%
Scott, 2005	1,326	Abstinence	3 years	41.2%
Chi, 2006	104 dual diagnosis patients	Abstinence	1 year	36.5% alcohol abstinence; 52.1% drug abstinence
Flynn, 2006	708 patients treated for cocaine dependence	Remission	5 years	33%

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Havard, 2006	495 treated heroin addicts	Heroin abstinence past month	1 year	59%
Hser, 2006	321 treated cocaine-dependent men	Cocaine abstinence for more than 5 years	12 years	52% (25% reported using marijuana; 9% reporting daily alcohol use)
Krampe, 2006	180 treated chronic alcoholics	Abstinence	7 years	60% at follow-up; 26% continuous abstinence throughout study
Lozano, 2006	291 adult cannabis users	Abstinence or moderation	16 months	61% (40.8% abstinence; 21.4% moderation)
Moos, 2006a	461 people seeking help for alcohol problems	Remission	16 years	62% for helped group; 43% for no help group
Moos, 2006b	628 individuals seeking assistance from alcohol information and referral center	Abstinence	Subjects participating 27+ weeks	55.8% for treatment group; 67% for AA participation group
Schutte, 2006	580 of 2,318 community sample with lifetime history of drinking problems	Remission	4 and 10 years	77.5% (56.9% remission with no treatment; 20.7% remission with treatment)
Cleveland, 2007	82 members of a collegiate recovery program	Abstinence	2+ years	73% continuous abstinence

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Dennis, 2007	1,162 treatment admissions	Abstinence	8 years	43% not using at follow-up; of these, 46.3% were abstinent less than a year; 25% 1-3 years; 12.9% 3-5 years; and 15.4% more than 5 years
Grombaek, 2007	148 patients treated for alcohol dependence	Abstinence	1 year	35% of MN model clinic patients continuously abstinent; 20% of public clinic patients; 53% of MN clinic patients abstinent for month prior to follow-up; 43% of public clinic patients
Hser, 2007	242 treated heroin addicts	5 years of abstinence from heroin use	33 years	43%
Jason, 2007	897 Oxford House residents	Abstinence since leaving Oxford House	1 year	81.5%
Laudet, 2007	219 patients treated for a substance use disorder	Abstinence since last follow-up	1 year	55% since last follow-up; 21.5% continuous abstinence throughout study



<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Moos, 2007	628 individuals who contacted alcohol information center	Remission defined as abstinence or light-to-moderate drinking, no alcohol problems, and consuming no more than 2 ounces of alcohol on any drinking day—all in past 6 months	16 years (1-, 3-, 8-, and 16-year follow-up points)	41% of total sample achieved remission; 65% of those who achieved remission had sustained this state at 16-year follow-up; 61% at 3 years for treated sample; 36% at 3 years for untreated sample
Ribeiro, 2007	131 crack cocaine users admitted to detox in Sao Paul, Brazil	Abstinence from cocaine	5 years	20% at 2 years; 40% at 5 years
Teesson, 2007	615 heroin users enrolled in Australian Treatment Outcome Study	Cessation/reduction of heroin use in past month; cessation of other drug use	3 years	67% reduction of heroin use 25% reduction of all drugs
Timko, 2007	345	Abstinence	1 year	41% and 51.4% for standard and experimental group
Dias, 2008	Follow-up of 131 treated crack cocaine users	Cocaine abstinence	2, 5, and 12 years	22.1% at 2 years; 39.7% at 5 years; 32% at 12 years
Fu, 2008	499 patients	40%	18 months	40% for African Americans and 47% for Caucasians

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Ilgen, 2008	420 treated persons with alcohol use disorders	Absence of alcohol-related problems	1, 3, and 8 years	52% at one year (36% abstinent; 16% drinking without problems); 52% of those reporting moderated drinking at year 1 experienced later alcohol problems
Laudet, 2008	312 crack cocaine and heroin users	Abstinence at follow-up	1 year	66.1%
McLellan, 2008	802 physicians treated for a substance use disorder	Completion of 5 years of monitoring; abstinence	5 years	81% completed 5 years of supervision; 81% had no positive urine screens in the 5-year period; of those who did, 74% did not retest later as positive
Teesson, 2008			3 years	78%
Wojnar, 2009	154 treated alcoholic patients in Poland	Abstinence	1 year	52%
Polcin, 2010	245 individuals living in sober living houses	Abstinence	18 months	42%
Xie, 2010	232 dually diagnosed patients	Remission of alcohol use disorder for 6 months	10 years	86% (34% abstinence; 66% asymptomatic use)
Robinson, 2011	364 treated alcoholics	Abstinence 90 days prior to follow-up	9 months	45.6%

<b>Lead Author of Study</b>	<b>Population and Sample Size</b>	<b>Recovery definition</b>	<b>Reported/ Estimated Duration of Follow-up</b>	<b>Recovery Rate</b>
Schaefer, 2011	673 veterans treated for substance use disorders	Abstinence for 30 days prior to follow-up interview	6 months	51%



**Recovery/Remission from Substance Use Disorders:  
An Analysis of Reported Outcomes in 400+ Scientific Studies, 1868-2011**

**Appendix C**

**Clinical Population (Adolescents)**

Abbreviations include: AOD = alcohol and other drug; IP = inpatient; OP = outpatient; SUD = substance use disorder; Tx = treatment; NA = not available in original study or paper in which study was reported, or ill-defined)

Lead Author of Study	Sample Size	Definition of Recovery/Remission	Length of follow-up	Recovery/Remission Rate
Scopetti, 1979 (Cited in Waldron, 1997)	33	Abstinence at follow-up	NA	57%
Sells, 1979	2,745	Abstinence from opiates	4-6 years	85% abstinent from opiates
Vaglum, 1980	100	Abstinence	4-5 years	Abstinence ranged from 24% to 56% across three groups
Grenier, 1985		Current abstinence	9 months	66%
Hubbard, 1985	132 treated adolescents	Abstinence at follow-up	1 year	60%
Query, 1985	134	Abstinence	6-7 months	22%
Keskinen, 1986 (Cited in Winters, 1999)	320	Abstinence at follow-up	6 months	67% (53% no use of alcohol; 68% no use of other substances)
Harrison, 1987	915 adolescents treated in residential	Abstinence with or without brief relapse during past year	1 year	67% (44% abstinent complete year; 23% with only brief relapse)

<b>Lead Author of Study</b>	<b>Sample Size</b>	<b>Definition of Recovery/ Remission</b>	<b>Length of follow-up</b>	<b>Recovery/Remission Rate</b>
Feigelman, 1988	73	Abstinence since discharge	3-8 years	3%
Brown, 1989	75	Abstinence for past 6 months	6 months	30%
Friedman, 1989	330	Abstinence since discharge	6 months	Abstinence from specific substances ranging from 65-95%
Brown, 1990		Abstinence through follow-up	6 months	57% (33% abstinent; 24% improved)
Marzen, 1990		Abstinence in past 12 months	5-6 years	28% of completers
Alford, 1991	157	Essentially abstinent (no use or 1-3 relapses)	6 months	71% of graduates
Griffen-Shelley, 1991	100	Abstinence at follow-up	1.5 years	35%
Hoffman, 1991	1,000	Abstinence for past year	1 year	40% abstinent for past year
Knapp, 1991	94	No alcohol or drug use	Unreported	39.4% no drug use; 33% no alcohol use.
McPeake, 1991	58	Abstinence previous 6 months	6 months	37% (73% currently abstinent)
Richter, 1991	160 treated adolescents	Abstinence	6 and 12 months	57% at 6 months (30% abstinence; 27% minor relapses); 62% at one year (36% abstinence; 26% minor relapses)
Filstead, 1992	1,127	Essentially abstinent (no use or 1 relapse)	11 months	37% abstinent; 10% with only one relapse since discharge

<b>Lead Author of Study</b>	<b>Sample Size</b>	<b>Definition of Recovery/ Remission</b>	<b>Length of follow-up</b>	<b>Recovery/Remission Rate</b>
Keller, 1992	19 of 275 community sample	No longer meeting diagnostic criteria for SUD	3 years	58%
Kennedy, 1993	100	Abstinence previous 3 months	3 months	62%
AARC, 1994	56	Abstinence since discharge from treatment	8-12 months	65%
Brown, 1994	142	Abstinence and asymptomatic use	6, 12, and 24 months	27% (14% abstainers and 13% non-problem users)
Stinchfield, 1994	254	Abstinence in prior 6 months	1 year	51%
AADAC, 1995	393	Abstinence for past month	3 months	27%
Bergmann, 1995	1,483	Abstinence	6 and 12 months	40% abstinent at 12 months
Brown, 1996	166	Abstinence in previous year	1-2 years	14%
Cady, 1996	234	Abstinence for prior 6 months	6 months	43%
Ralph, 1996	172	Abstinence in previous 10 months	1 year	33%
Richardson, 1996	109	Abstinence in previous 6 months	5 years	30% (plus 26% with only minor relapses)
USDHHS, 1997	236	Abstinence in previous year	1 year	30%
Hsieh, 1998	2,317 treated adolescents	Abstinence at follow-up	6 months and 1 year	52.6% at 6 months; 48.2% at 12 months

<b>Lead Author of Study</b>	<b>Sample Size</b>	<b>Definition of Recovery/ Remission</b>	<b>Length of follow-up</b>	<b>Recovery/Remission Rate</b>
Perkonigg, 1999	German community sample of 1,228 adolescents	Remission of cannabis abuse or dependence	1 year	41% for cannabis abuse; 31.7% for cannabis dependence
Brown, 2000	157	Abstinence	1 year	21% abstinent since discharge
Kelly, 2000	99	Abstinence	3 and 6 months	31% at 3 months and 30.3% at 6 months
Latimer, 2000	225	Continuous abstinence	1 year	14.6% alcohol abstinent; 22.2% cannabis; 28% other illicit drugs
Winters, 2000	245	Abstinence or minor relapse	6 months and 12 months	53% at 12 months (19% abstinence and 34% with minor relapse)
Brown, 2001	162	Abstinence or subclinical use	4 years	25% (7% abstainers; 8% occasional use without major relapse; 10% slow improvers); relapse followed by progressive improvement
Harrison, 2001	387 treated adolescents	Abstinence	6 months	21.4%
Maisto, 2001	131	Abstinence and use no longer meeting diagnostic criteria	1 year	51% (18.6% abstinence; 32.5% subclinical use)
Spooner, 2001	60	Abstinence and reduced use	6 months	Abstinence rates for alcohol, cannabis, opioids, and stimulants were 43%, 31%, 61%, and 83%



<b>Lead Author of Study</b>	<b>Sample Size</b>	<b>Definition of Recovery/ Remission</b>	<b>Length of follow-up</b>	<b>Recovery/Remission Rate</b>
Godley, 2002	114	Abstinence from cannabis and alcohol use	3 months	52% abstinence from cannabis; 50% abstinence from alcohol
Henggeler, 2002	80 treated adolescents	Abstinence from marijuana and cocaine	4 years	55% for marijuana; 53% for cocaine
Maisto, 2002	73	Abstinence and remission of DSM criteria	3 years	52% (12% abstinence; 40% reduction to non-problematic use)
Chung, 2003 Multiple Studies				
Grella	1,167	Abstinence	1 year	25%
Chung	310	Abstinence and non-problem drinking	1 year	43% (13% abstainers; 30% non-problem drinkers)
Winters	245	Abstinence or use with no symptoms	3 years	25% (4% abstinence; 21% non-problem drinking)
Abrantes		Abstinence or infrequent use	5 years	36% improvement
			8 years	46% (22% abstainers; 24% infrequent users)
Cornelius, 2003	59 adolescents completing OP treatment	Abstinence	6 months	34%
Dennis, 2004	600	Living in community with no use or AOD-related problems	1 year	Comparison of treatment conditions produced recovery rates ranging from 17-34%

<b>Lead Author of Study</b>	<b>Sample Size</b>	<b>Definition of Recovery/ Remission</b>	<b>Length of follow-up</b>	<b>Recovery/Remission Rate</b>
Godley, 2004	563 treated adolescents	Less than 10 days of use during 1 year follow-up	1 year	50.9% (30.3% low use in community; 20.6% moderate and decreasing use in community)
Tomlinson, 2004	126 with substance use and psychiatric disorders	Abstinence	6 months	26% in SUD-only group; 13% in SUD and Psych Disorder group
Brown, 2006		Abstinence or minor relapses	6 months and 4 years	27% abstinent; 30% minor AOD use 6% abstinent at all follow-up points over 4 years
Winters, 2007	159	No substance dependence diagnosis at follow-up (could have substance abuse diagnosis)	1, 4, and 5.5. years	42.8% (6% abstinence)
Larm, 2008	2,088 treated adolescents	No long-term substance-related adverse consequences in adulthood	15 years and 30 years	20%
Chi, 2009	357 treated adolescents	Abstinence from alcohol and drugs in previous 30 days	3 years	30%
de Dios, 2009	1,179	Abstinence	12 months	32-33%
Sterling, 2009	296 treated adolescents	Abstinence from both alcohol and drugs	3 years	29.7% abstinence from both alcohol and drugs

Lead Author of Study	Sample Size	Definition of Recovery/Remission	Length of follow-up	Recovery/Remission Rate
Anderson, 2010	153 treated adolescents followed into adulthood	Abstinence	10 years	28.7%

**Reminder on Recovery Rate Calculations:** In reviewing the data in Appendices A, B, and C, the reader is reminded that the definitions of remission, recovery, abstinence, improvement, etc. varied considerably across the studies profiled, as did the method through which the rates were calculated. Where they were present, I have reported the rates as they were presented in the original study. Where no rate was reported but a rate could be extrapolated, I calculated the rate with the available data. While averages reported for all studies are helpful in measuring as best we can the prevalence of recovery and rates of recovery, it is not possible to compare rates across studies due to these differences in definition and method of measurement.